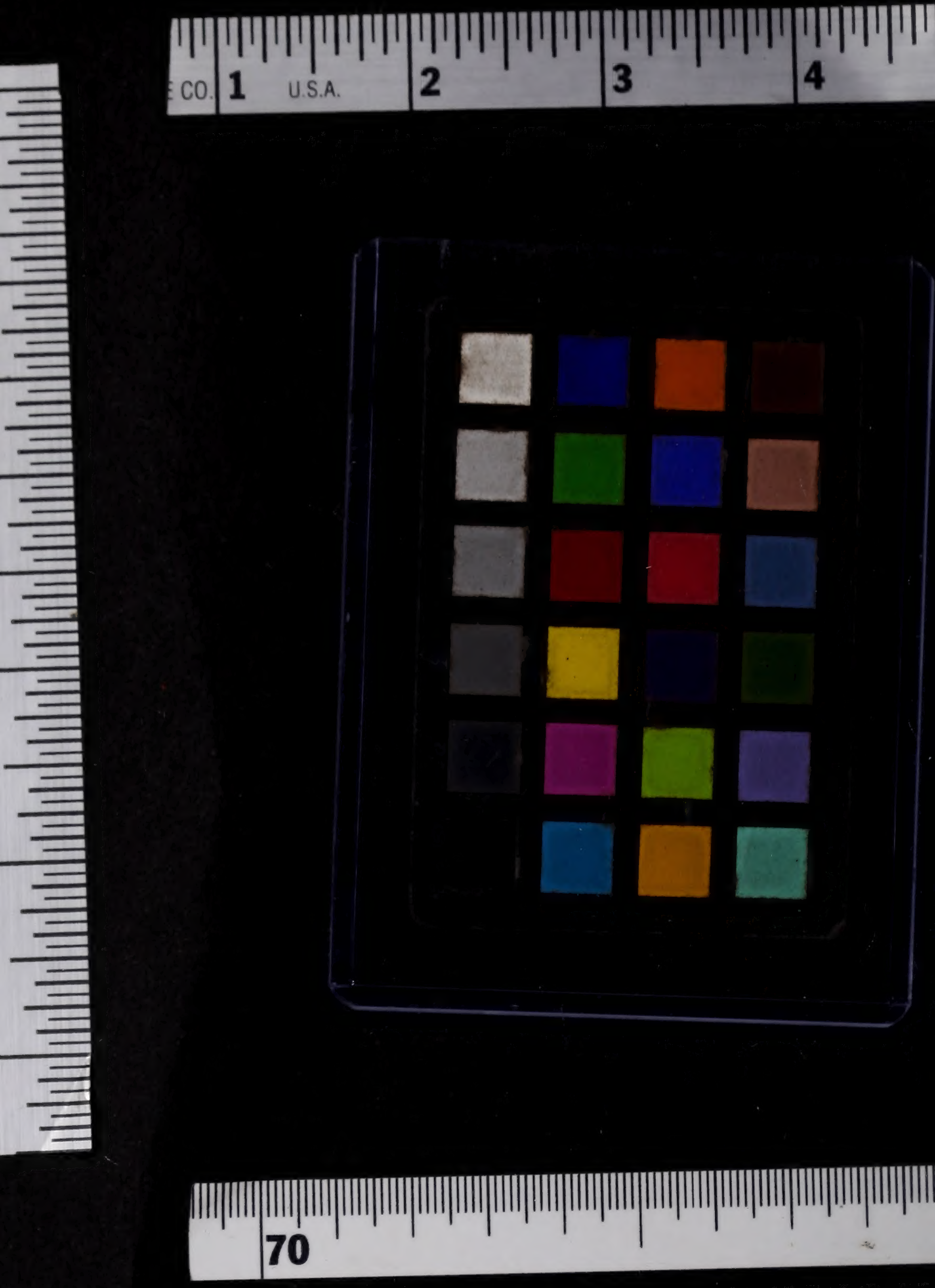
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T. H. [illegible] 1/2 mo. dif. colo.

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Vol. III. JANUARY, 1884. No. 1.

ORIGINAL COMMUNICATIONS.

CONCERNING RECORDS.

[Presented at the Second Annual Meeting of the New England Dental Society, Providence, R. I., Oct. 4, 1883.]

BY GEO. L. PARMELE, M. D., D. M. D., OF HARTFORD, CT.

Prior to October, 1878, I made use of "Waters' Dental Register" to record my operations, and up to that time filled several books; but finding these records inconvenient of reference, I was turning the matter over in my mind with the idea of a simpler and more perfect method, when, almost by accident, while in pursuit of an entirely different object, I was put on the track of my present system through the kindness of my friend, W. I. Fletcher, Esq., of the Watkinson Library of Hartford.

Since that date, October, 1878, I have derived so much comfort and satisfaction from the manner in which I have preserved the records of my practice, that I decided, upon being solicited to present a paper at this meeting, to offer a few words concerning my method of keeping records,—a method which, so far as I can learn, has been adapted to use in the dental office only by myself.

The plan which I have adopted is an adaptation of the card catalogue system now in use in most libraries.

One can readily see how nearly impossible it is to keep *in a book* an absolutely perfect alphabetical list of the books in a library to which constant additions are being made, for sooner or later, no matter how arranged, the titles would require re-arrangement. To obviate this difficulty, a plan known as the "*card catalogue*" was devised at the library of Harvard University, if I be not mistaken, which is now in general use in libraries, and has also been adapted to many other uses.

For use in this catalogue, slips of Bristol board, properly ruled and known to librarians as *standard catalogue cards*, are now to be obtained of dealers in library supplies. The size of the standard card is 5x12½ cm. (2x5 inches), and costs per 1,000, for Bristol board, $1.75 ; and for best ledger paper, $1.00, when last I purchased any.

The manner in which these cards are used is as follows :

We will suppose that Garretson's Oral Surgery has just been added to a library and is to be catalogued. The librarian would make at least two cards.

1. The Author's Card.

> GARRETSON, James, M. D., D. D. S.,
> A System of Oral Surgery,
> Being a Treatise on the Diseases and Surgery
> of the Mouth, Jaws, and Associate Parts.
> Third Edition. Philadelphia, 1881.
> No. 538–13.

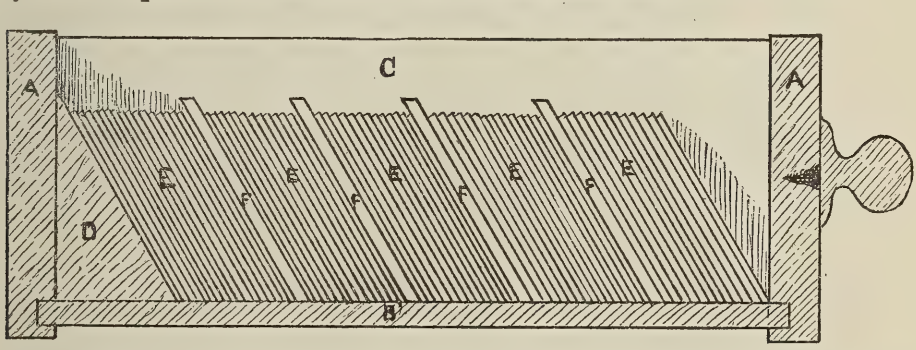
2. The Subject Card.

> ORAL SURGERY. A System of,
> Being a Treatise on the Diseases and Surgery
> of the Mouth, Jaws, and Associate Parts.
> By James Garretson, M. D., D. D. S.
> Third Edition. Philadelphia, 1881.
> No. 538–13.

These cards would then be placed in regular and exact alphabetical order in drawers or boxes designed for the purpose, and so arranged that the cards are loosely retained at an angle of about forty-five degrees, with the top edges of the cards inclined from you, in order to facilitate consultation.

Now, no matter how many, or what the additions to the library are, the alphabetical arrangement of the catalogue will always be absolutely correct.

For finding at once any desired portion of a card catalogue (letters of the alphabet, subjects, authors, etc.), pieces of wood the size of a standard card, and one-eighth to one quarter of an inch in thickness, and covered with paper, are used in their proper place in the same manner as a card. On the upper edge of this block, the letter, subject, author, or guide-words, whatever they may be, are printed. In place of wood, zinc plates can be used. These plates are one-half a centimeter wider than the catalogue cards. This narrow strip is bent over backwards so that in the ordinary sloping position of the cards it shows plainly. The desired guide-word or letter can be printed on the zinc slips with platinum chloride with a quill pen, or they can be painted white and written on with ink.

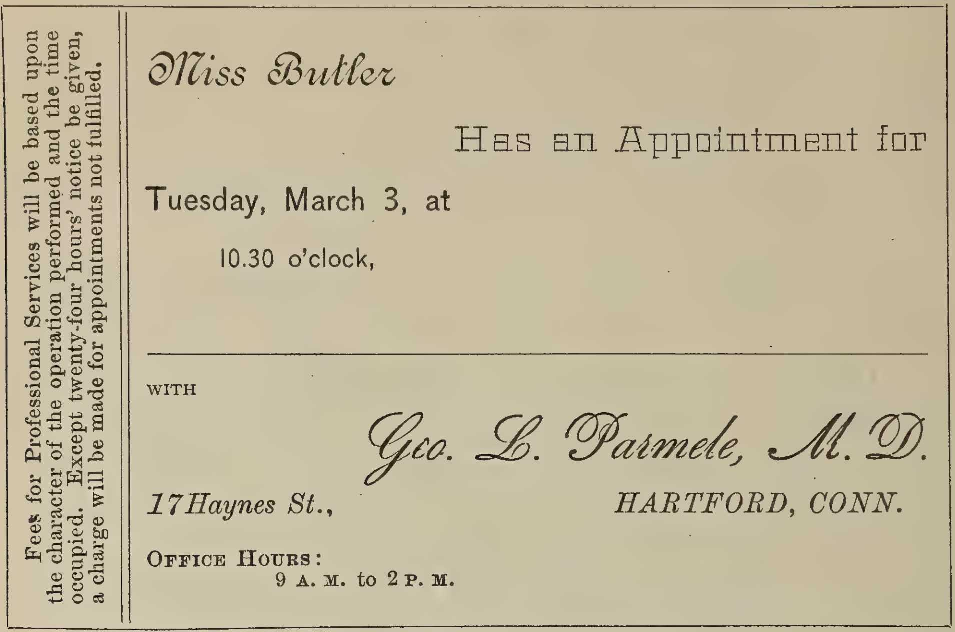


This diagram, representing a longitudinal section of a drawer (or box), with the cards in place, will perhaps present the arrangement more clearly. A, A, ends of drawer; B, the bottom; C, the remaining side; D, a triangular block of hard wood fastened to end of the draw to give proper slope to the cards; E, E, E,—F, F, F, F, wooden or zinc guide-slips to facilitate finding any particular portion of the catalogue.*

To present more clearly the adaptation of this system to office records, and also to illustrate my plan of dental book-keeping, which I believe is peculiar to myself, we will suppose that a patient has just entered my office for the first time and desires my services. It is my usual custom to give an appointment for a thorough examination at such time as is mutually agreeable. We will imagine the patient's name to be Miss Butler. She is given an appointment card as follows :

---

*This drawing ought to show a triangular block (D) at each end of the drawer.—G. L. P.



Fees for Professional Services will be based upon the character of the operation performed and the time occupied. Except twenty-four hours' notice be given, a charge will be made for appointments not fulfilled.

Miss Butler

Has an Appointment for

Tuesday, March 3, at

10.30 o'clock,

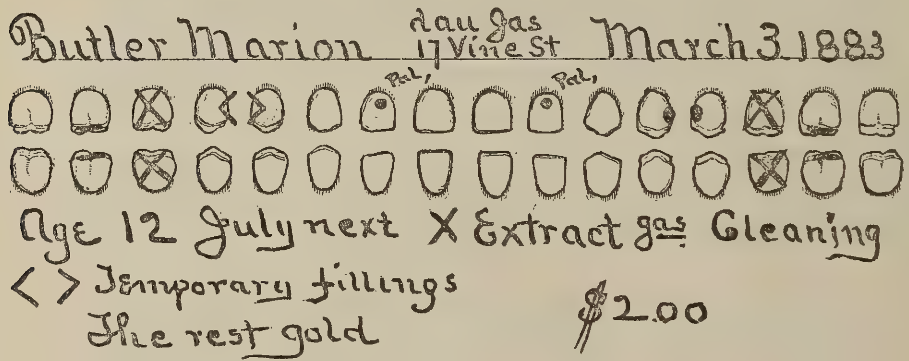
WITH

Geo. L. Parmele, M. D.

17 Haynes St., *HARTFORD, CONN.*

OFFICE HOURS:
9 A. M. to 2 P. M.

An appointment is then entered for that day and hour in the *appointment* or *day-book,* which will be described and explained later. Half-past ten Tuesday, March 3, arrives, and Miss Butler, presuming her to be true to her engagement, arrives also. The examination proceeds, and at the same time, on a *standard card* on which is printed a diagram of the teeth, is recorded the result of the search, which being ended, the *examination card* appears thus:



Butler Marion dau Jas 17 Vine St March 3 1883

Pal, Pal,

Age 12 July next X Extract gas Cleaning

< > Temporary fillings
The rest gold $2.00

This card I place in a drawer of my operating cabinet, where is also an examination card for each patient at the present time under treatment. Here it remains during the time that the operations (marked as necessary) are in progress. Upon the completion of each operation, a red mark is made through the corresponding spot on the examination card indicating that here all is finished. By this habit I am enabled to know at a glance each time the patient arrives just what progress has been made, and do not require to waste valuable time in re-examination. When the treatment is entirely finished (and red marks cover all the black originals), this examination card goes to the *card catalogue record* case or box, in its proper place among the record cards.

Miss Butler, at the end of her examination, retires with another appointment, and furnished with a similar card or paper on which are marked the teeth she is to lose and the address of Dr. Blank, who will administer gas and extract as indicated, which in this mouth are the much-talked-of six-year molars, which I consider in *her particular case,* they being badly carious and the teeth crowded, to be of more value out of the mouth than in. On her departure, two dollars, or whatever the fee may be, is charged on the appointment or day-book opposite her appointment for that day.

As some of you may be wondering why I do not extract these teeth myself, I will explain. I had rather send my patients to an expert in extracting (I don't mean these advertising gas shops) than to do it myself, for the following reasons :

1 (and greatest). Because, notwithstanding the fact that I could do it, if necessary, I had rather cut a man's head off than to extract a tooth.

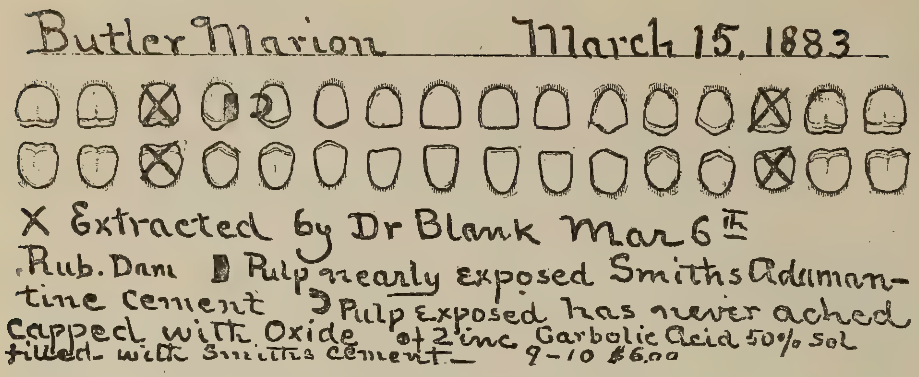
2. Because, in my practice there being little extracting to do, I lack the manipulative ability in this direction which one who constantly extracts acquires.

3. Because, children knowing I never extract teeth, have not that dread of me they otherwise might have.

4. Because it brings a class of patients which I had rather not see.

5. Because patients in the reception room can be more agreeably entertained than by the incidents apt to attend extraction and the administration of anæsthetics.

When Miss Butler comes for her next sitting I inquire the date her teeth were extracted and record it with her operations for the day, which we will suppose are upon the right superior bicuspids, they requiring immediate attention. When she has finished for this sitting a record card is filled out for her as follows, and a charge made on the appointment book of six dollars.



Butler Marion March 15, 1883

X Extracted by Dr Blank Mar 6th

Rub. Dam ▮ Pulp nearly exposed Smiths Adamantine cement Ↄ Pulp exposed has never ached capped with Oxide of Zinc Carbolic Acid 50% sol filled with Smiths cement 9-10 $6.00

Whenever a longer record is desired, both sides of the card can be used, and in case of a record of extreme length, a plain standard card could be used to continue the record on, but as a rule one card is enough. These cards I arrange in this way: For instance, Miss Butler's cards would very likely follow after those of a patient named Bushnell; at any rate, they would be in regular alphabetical order, and her individual cards follow each other according to date, so that her examination card bearing date March 3, when put in its place, would come before that operation card dated March 15. The card upon which her last operation is recorded would be followed by those of the next patient in regular alphabetical order; perhaps it might be her sister Ruth; or a patient with another surname, as chance might dictate. Or I might say that the names on cards follow in alphabetical order, and the cards of each individual patient are arranged as to date. When cards of a particular letter accumulate to such an extent as to warrant it, guide-slips might be labeled and put in as sub-divisions. For instance, the sub-divisions of B, for example, would be Ba, Be, Bi, etc. Or where there are many of a particular surname or family name, the family name might be put on a guide-slip, as Butler for example.

My appointment book, on which the above engagements and charges are made, answers much the same purpose as does the day-book or journal in general book-keeping. It is a book about seven and one-half inches long and five inches wide, ruled as a day-book, with the day of the week and month at the top of each page,—the left hand column, where the date is usually placed, being used for hours of appointments. In this book I record appointments, charges to patients, credit cash received, and keep an account of office expenditures. In charging fees in this book, as well as in the ledger, I only enter the amount, as I can easily get at the particulars by reference to my card records.

This page from the appointment book will present the idea clearly.

Friday, March 13, 1883.

9	Marion Butler,	$ 6	00		
10	John Ives,	10	00		
	Cr. Cash,			$10	00
11.30	Robinson Crusoe,	3	00		
	Cr. Cash,			37	00
12	Thomas Dodd,	5	00		
1	Joe. Jefferson,	6	00		
		$ 30	00		
	Am't brought fwd.	1082	00		
		$1112	00		
8	Veteran C. G. meet.				
	Alcohol lamp,		75		
	Files,	$ 1	25		
	Bill G. E. Hodge,	30	00		
		$ 32	00		
	Brought fwd.	180	00		
		212	00		

It will be seen that Butler, Dodd and Jefferson's charges are to be posted into the ledger;

That Ives paid cash for the service rendered;

That Crusoe has his last sitting and pays like a man the full amount of his bill.

The item, amount brought forward, represents the charges for the year up to this morning which, added to the amount of the day, gives total to date.

The note, "Veteran C. G. meet.," reminds me of a meeting for that evening.

The charges at the bottom are for office expenditures.

The only other book employed by me is a ledger, to which those accounts are posted for which cash is not paid.

Bills for all accounts are sent to patients on the first day of the month following the completion of operations, and these bills give only the *total amount* for professional services rendered. Where there are several in a family, the amount for each individual is given; and in special cases the date and amount of fee for each sitting, but no items other than these are put on the bill.

In case of any misunderstanding as to account rendered, the party is requested to call, when he has access to the card records, where everything is fully explained.

It is my experience that accounts are settled more promptly and with less misunderstanding when they are presented monthly than when long credit be given.

This system of card records has been a great comfort to me for the past five years, as it enables me at a moment's notice to find each and every operation performed for a given patient.

I am now making an index of my old record books on plain standard cards, in the following manner:

JONES, Captain John. May 3, 1870.

1870.
May 9th,
" 16,
" 23,
1871.
June 15,
" 18,
1873.
Jan. 4,
" 8,

These cards, when completed, will be put in the drawers in their proper places with the later records for the same patient, so that when I desire a full life history of any given mouth I can at once find it.

As you see patients from day to day, you can note down any points of interest concerning the case, and if at any future time you desire to make a report of the case you can from these notes write it out in full for publication or other use.

There are several other ways in which these standard cards can be utilized to advantage, among which I will mention

1st. *As records of a certain class of cases.*

Suppose, for example, you desire to keep a record of cases in which pulps were treated in a certain manner, you could make a card like this:

PULPS Capped with Oxide of Zinc and a 5% Sol. of Carbolic Acid.

Marion Butler,
John Fenn.
Job Pratt.
Henry Ball.

Then, as cases presented of interest in this particular class, the name of the patient so treated would be added to the list. These special cards can be put in alphabetical order among the other record cards, or a separate drawer or box assigned them.

Should you desire to tabulate the cases after they have accumulated, or write out the results for publication, you have the facts at your immediate command.

2d. *As an Index Rerum.*

Suppose at a meeting like the present, or in your reading general or professional, you are impressed with some thought, subject or fact that you desire to note down, so that you may re-read, think of or perhaps write upon.

Or suppose you are thinking of preparing a paper "when the spirit moves," upon a certain subject, and you come upon points in your reading which may be of use to you for this purpose. Just here you will find these cards, or slips of paper the same size made into pads, for pocket or desk use of particular advantage. On these you can enter your thoughts, extracts, references, etc., starting them with such guide-words as will be most easily thought of when you desire to refer to them.

The following are given as examples:

TEETH, Curious Items Concerning.—*John. Dent. Mis. VIII., 229.* Fashion in Deformity.—See also *Pop. Sci. Mo., XVII., 721,* where the original article appears, illustrated.

Polishing Instruments.
Cosmos, Vol. IX., 262.

Here is one for a formula you think you may like to try:

Neuralgia Facial.
Ther. Gazette, March 15, 1883.
℞. Bromide Potass. ℥ss.
Fl. Ext. Jamaica Dogwood, ℥ii.
Syrup, q.s. ad. ℥iv.
M. Sig. Teaspoonful every hour until four doses have been given.

When a case presents on which you think you could employ some such prescription to advantage, you know just where to look for it.

The cards of this class (Index Rerum) I keep in a drawer or box by themselves and divide them into classes by the wooden or zinc slips, on which are written such guide-words as these, for example:

ART.
GENEALOGY.
ORAL SCIENCE.
Examples of Subdivisions.
- Irregularities.
- Operative.
- Prescriptions.
- Microscopy.

PHOTOGRAPHY.

Thus you see how easily one can register many references otherwise easily forgotten, and all grouped together so as to be most convenient and suggestive.

In this Index Rerum you can use, if you so desire, cards and slips the size of postal cards. These can be had of dealers in library supplies.

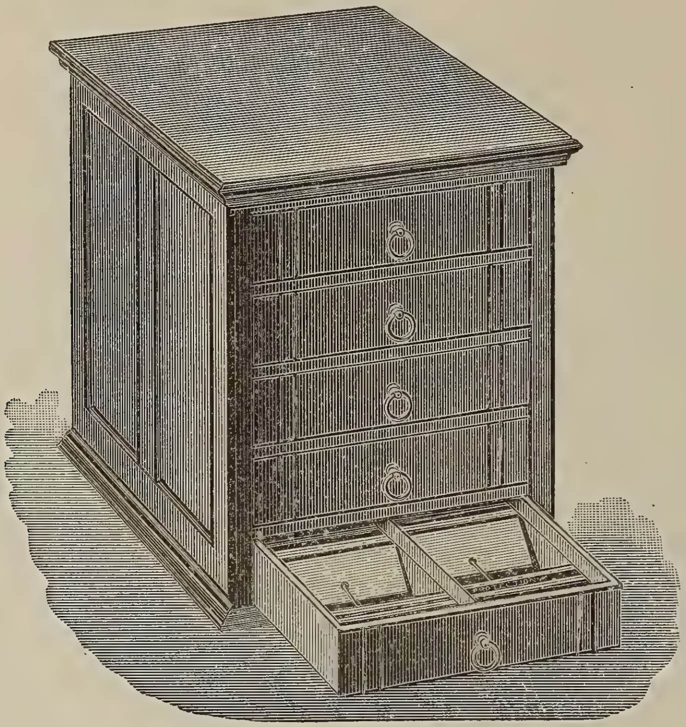
But, I hear you say, to get all the outfit required to keep our records in this way must be expensive, and we can't afford to purchase blocks, zinc slips, cards, cases, etc.

Well, suppose you can't. I say you do not require them, still all these appliances are a comfort to enjoy when your cards demand them. I have, as I said, kept card records for five years and have not yet a complete outfit such as I hope to purchase soon. All you require are first cards standard size with diagram of teeth upon them. Should you desire to economize, you can omit the diagram and get plain standard cards, using a species of dental short-hand notes to show location of operation, somewhat like this:

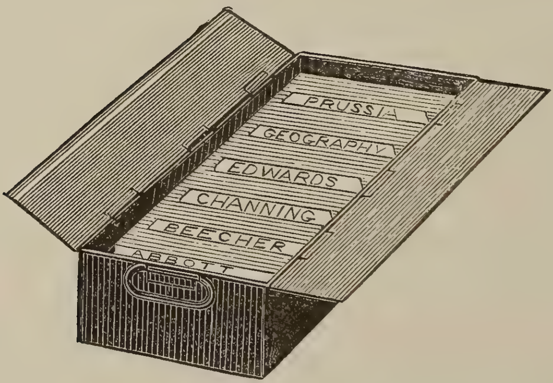
ROACH, Johnnie. Sept. 9, '83.
R. S. 2 bi d sur pulp exposed.
Capped, &c.

Now these cards cost per 1,000, $1.75, and a thousand will go a great ways. Still, if you must cut down the expense still more, use heavy paper in place of cards. Then for your case you can use any box of the right size, say, an envelope box; or partition off a place in a drawer in your desk for them as I have done. Make the triangular slope-block and the wooden slips yourself. Any scroll saw store will furnish you just the stuff to make the latter of. Even the wood in cigar boxes will do. Thus you see the cost is very small. Another way to economize is to use the same card for many operations in the same mouth. This plan, however, I personally dislike. Later, as your cards accumulate (and perhaps your money also), you can go in for the luxuries. At any rate, if you will not keep your records in this way, try the index rerum, and you will never regret it. You had better obtain your standard cards, however, from a regular dealer in these goods as you will find them much more accurately and smoothly cut to the standard size. The Library Bureau, 32 Hawley St., Boston, is the only place I know of, but there may be others. Perhaps you object to the space the cards will occupy, but you will not when you see how small it is. I have just measured, and find that 1,000 standard cards can be accommodated in a space 12½x5⅛x2¼ inches, and all my records for five years occupy a space only 40 inches long. Hence, you see it will be a long time before you need one of the cases designed for card catalogues; but should you desire one, they can be had ready-made, of black walnut, finely finished, paneled sides, and nickeled trimmings, for the following prices, which I copy from an old price-list. (They may be less now.)

4-drawer case, holding 4,000 cards,	$5.00
4 " " and complete fittings,	7.70
5 " " 15,000 cards,	8.50
5 " " and complete fittings,	12.75
10 " " 20,000 cards,	14.00
10 " " and complete fittings,	22.25



A Five-Draw Card Case.



A japanned Tray, with cover, holding 500 cards, complete with fittings, $1.75.

If you will step into any large library, the librarian will gladly show you the complete working of the system and give you such information as you may desire to have.

In closing, I will tell you of another plan I find works well in my practice. You all know how easy it is for patients to unwittingly postpone coming for an examination, to have a temporary filling watched, or for any such service, if left to their own remembrance. To aid them in this matter, I arrange with many of my patients to enter their names on a list I keep for the purpose, and to send them word about a certain time that their teeth should be examined or that "such a thing" needs attention. I find they are as a general rule very grateful for such reminders, and it is useful to both of us. This notice, which is printed on what are known as correspondence cards, is as follows:

GEO. L. PARMELE, M. D.,
17 HAYNES ST.,
HARTFORD, CONN.
From 9 A. M. until 2 P. M.

____

When you were here ____________________
you wished me to send you an appointment about this time, for ____________________
I have given you ______________ *at* ______________
o'clock. If not agreeable, please let me know at your earliest convenience.

I am fully aware that the majority of dentists will not care to take the trouble about their records that this system *seems* to require. For them, this plan is not presented, but for men who enjoy thinking and reading, men who devote time and thought to their records and literary pursuits, I present these suggestions, in hopes that some of the ideas thrown out may prove of value.

NOTE.—Since my paper was in type, Mr. Davidson, of the Library Bureau, 32 Hawley street, Boston, has kindly offered to furnish cards similar to mine, with diagrams of teeth on them, at the same price as their regular patterns of standard cards.

The prices given in my paper for cards, cases, &c., which I took from an old catalogue, will be found to vary somewhat from those in a new one (now in the hands of the printer). Still, the changes are so slight as to make no practical difference. It is entirely for the benefit of the profession that I present this system of records, as the only pecuniary interest I have in this matter is that I had to become responsible to the "Bureau" for the sale of twenty thousand cards, in order that the profession might have them at this low price.

G. L. P.

ACONITE.

BY GEO. A. MAXFIELD, D. D. S., HOLYOKE, MASS.

[Read before the Connecticut Valley Dental Society, at Springfield, Mass., Nov. 1883.]

The ancients, who had a very limited knowledge of the mineral poisons, considered aconite as the most deadly thing in nature, and with modern experience it is considered as one of the most subtle of all known poisons. At present, our knowledge of aconite is somewhat limited, yet clinical experience with the drug has reduced it to so manageable a condition as to make it of incalculable value as a therapeutic agent. Its prompt action and the satisfactory results obtained from its use has made it one of the indispensable remedies in dental practice, yet many dentists still hesitate about using such a violent poison. In my own practice, I have found it so valuable as a prophylactic and analgesic that I think it worthy of our attention at this time, so I have prepared this short paper.

Aconite was first employed in medicine by Baron Störch, of Vienna (who published an account of his experiments in 1762), and it was variously employed after that date. In 1813 it had again nearly fallen into disuse, while to-day its use in medical practice is well nigh universal.

There are several different plants of the aconite species, the active principles of which are very nearly allied, but nearly all have been discarded, and the aconitum napellus is the only officinal plant; the root of the Indian aconite or bish is supposed to be more powerful, and is preferred for the manufacture of aconitia. Aconitum napellus is a perennial, indigenous in Europe and Asia, but is cultivated in this country for the sake of its flowers, and is commonly known as wolf's-bane or monk's-hood.

The taste of the root and the leaves is the same—a bitterish and acrid, and after a little while it causes a benumbing and tingling sensation in the mouth and lips. At present, the root only, from which is made a *tincture* and an *extract*, is officinal, and is generally used instead of the leaves. The root is from three to four inches long, tapering, and about three-quarters of an inch across the base. It has been mistaken by many for horse-radish root, though it may be distinguished by its external brown color and the absence of odor when scraped. These mistakes have had serious results: A case is recorded in 1813 of a man dying in two hours after eating one root and part of another. The active principle of the plant is an *alkaloid*, called *aconitia;* was first discovered in 1833 and, when prepared according to the U. S. Pharmacopea, is a yellowish white powder, and odorless. Since then, another alkaloid has been found in the root, called *aconelline*, which closely resembles *narcotin*, and has led to the belief that they are identical. Aconite as a poison is most intense in the root, less in the seeds, and still less in the leaves before the plant is in blossom. The alkaloid aconitia is a poison of tremendous activity; as little as one-fiftieth of a grain has produced very nearly fatal results. If the dose of aconite is large, death may be immediate; and if given hyperdermically, it may occur in less than one minute. After a poisonous dose has been swallowed, the symptoms occur in from five minutes to half an hour. They are great disturbance of respiration, muscular weakness, and vascular depression. The first thing noticed is a burning or tingling in the throat or in the extremities, which soon spreads over the whole body. The pulse rapidly falls, in a short time becoming very weak and irregular; finally imperceptible. The muscular strength is very much reduced; the respiration is feeble and infrequent; general sensibility is so much benumbed that a marked anæsthesia of the whole surface is perceptible; a cold sweat covers the body; the face is sunken and livid, the eyes often protruding; the eyesight becomes dim and, toward the end, may be lost; burning in the stomach is complained of, and severe vomiting may occur; the voice grows weak and is lost, and death may occur suddenly (especially after some exertion) from syncope. After death no characteristic lesions are found. The only diagnostic symptom in aconite poisoning is the peculiar tingling, which is very characteristic. As yet, there is no decided *antidote* known. As alcohol, ammonia, turpentine, digitalis, and heat antagonize the action of aconite, they are therefore proper remedies to use. In aconite poisoning, first empty the stomach and wash it out well with the stomach pump, then freely administer hot and concentrated alcoholic liquors both by the stomach and rectum, and inject ammonia into the veins. The patient should be kept perfectly quiet, lying on the back, with the feet raised a little higher than the head, and external warmth should be applied. Digitalis has been used hyperdermically with advantage. Laudanum given in drachm doses has been known to restore a patient apparently in a dying condition, while clinical experience already justifies the use of the tincture nux vomica in combination with digitalis.

Aconite produces in man and the lower animals almost identical symptoms, so that conclusions arrived at from experiments upon the latter are accepted as applicable to the former, and much knowledge of the action of aconite has been gained in this way. The systemic effects of aconite follow within half an hour after its administration. Its action upon the circulation is at once noticeable, causing a reduction in the number and force of the heart beats and lowering the arterial tension.

Its action upon the respiration is also very decided, rendering it very slow—an inspiration being followed immediately by a prolonged expiration. It affects the sensory nerves before the motor, paralyzing first the end organs, next the nerve trunks, and finally the centers of sensation in the cord. The power of voluntary movement continues after the cessation of reflex functions, but this is finally lost. It also increases elimination by the skin and kidneys, and with an increase of fluid discharges there is also an increased discharge of solids. Large medicinal doses produce gastric pains, nausea, and even vomiting. If the gastro intestinal mucous membrane is in an irritable state, aconite impairs the appetite, retards digestion, and causes diarrhœa; while, if the membrane is in its normal condition, aconite increases its secretions and hastens peristaltic movements.

Prolonged contact of aconite upon the skin produces almost the same results as when a drop of the tincture is placed upon the tongue, producing a warm and pungent sensation, followed by intense tingling and numbness. The whole duration of the effect of aconite is about three hours. Aconite is therefore considered to be a direct cardiac poison, and also a sedative to the vasor motor nervous system. It is also a respiratory poison, by its paralyzing action on the muscles of respiration, though the action of the heart generally ceases before respiration. In 1856, so little was known of the action of aconite, that Dr. Geo. B. Wood, in his Materia Medica and Therapeutics, published that year, says: "Care should be taken not to apply the tinctures to abraded, ulcerated or wounded surfaces, or to that of the mucous membranes," and I find that this opinion, erroneous in regard to applying the tincture to the mucous membranes, is still inculcated in a few of the recent works on materia medica. In medical practice, the use of aconite is constantly growing in favor. Dr. Roberts Bartholow, in his work published in 1878, says: "We have no remedy more valuable in erysipelas than aconite, it being decidedly beneficial in facial erysipelas. Neuralgia, when accompanied by arterial excitement and muscular spasm, is also relieved by aconite."

Tonsilitis, acute pharyngitis, and ulceration of the tonsils, are some of the diseases for which he recommends its use.

Aconite is indicated in the early stages of simple inflammatory fevers, in the early stages of pneumonia, and in most acute congestions. When administered at the commencement of the disease, it at once diminishes the force and frequency of the heart's action; moistens the skin with perspiration, thus reducing the temperature to the normal standard, thereby allaying the fever and preventing the spread of any congestion that may have occurred. Aconite also proves valuable in surgical fever. Dr. H. B. Wood says: "One indication that aconite will meet, is to relieve over-excitation of the sensitive nerves, and aconitia endermically applied has proved valuable in neuralgia."

By many other writers it is considered especially valuable for the relief of superficial pains, and of spasms which are not of too severe a type, both by its internal and external administration.

"Dr. Anstic places it among those remedies for neuralgia, which act by locally interrupting the conductivity of a sensory nerve, and thus giving the nerve-center time for rest and self-recovery"; and Dr. Ringer says "that if aconite be likely to give relief to pain, it will do so quickly."

Aconite has recently been recommended by some for its diuretic effects, but clinical experience has not yet established its efficiency in this direction. The doses of aconite are, of the officinal tincture, which is of the strength of six ounces to the pint, from one to five drops. Fleming's tincture is stronger, being ten and one-half ounces to the pint. Dose of the extract is from one-quarter to three-quarters of a grain. Of the alkaloid, aconitia, the dose is $\frac{1}{125}$ of a grain, but on account of its intense activity it is seldom given internally, and in its external use great care should be used.

Aconite, therefore, being so powerful a remedy, and such an active poison, should not be used by any one ignorant of its characteristics, and only used with great care and judgment. In dental practice, in careful hands, the local use of the drug will be attended with the best results. It is very efficient when applied locally to a sensitive or painful part, owing to its contact in a concentrated state with the irritated nerves.

In *inflammation*, we first have an irritation, then congestion, then inflammation, which, if not relieved, is followed by suppuration.

In the early stages of inflammation about a tooth (the cause of the irritation being first removed), aconite is a powerful abortive remedy. Alveolar abscess always results, or is the suppuration following pericementitis or inflammation of the pericementum.

In the treatment of pericementitis, aconite is therefore indicated. In the early stages, apply it to the affected part by moistening a piece of cotton with the tincture and allowing it to remain on the gums for a few minutes. If congestion has occurred, scarify the gums, allowing them to bleed freely, then apply the aconite. According to Waller, who has made very careful experiments, it was found that alkaloids dissolved in chloroform are readily conveyed through the skin into the blood and produce characteristic phenomena; while alcoholic and aqueous solutions are either not at all or very slowly absorbed. For local use, therefore, aconite when combined with chloroform produces the best results. Aconite is very efficient in relieving inflamed pulps and, placed in the pulp cavities, in preventing periosteal inflammation. After filling roots of teeth, aconite should always be applied to the gums over the roots, for it not only relieves soreness caused by the operation, but, by its sedative influence, prevents inflammation of the pericementum. Excellent results are obtained by combining equal parts of chloroform, tincture iodine, and aconite tincture.

Another combination, of tincture aconite two drachms, tincture iodine four drachms, and chloroform one ounce, is an excellent application in incipient alveolar abscess. Aconite is often useful to relieve the after pains of extraction, and as I have found it of great service in relieving the soreness or uncomfortable sensation caused by the rubber dam clamps and ligatures, I always apply it after removing the dam.

Fleming's tincture, which is about a saturated tincture, is the best for dental use, but it must always be borne in mind that it is a medicine of intense activity, as only three drops have been known to produce alarming results.

I have frequently found patients very susceptible to its influence, the moistened cotton when applied to the gums causing an unpleasant sense of constriction of the fauces, continuing over an hour. For such persons, I prefer to use the officinal tincture.

In the treatment of alveolar abscess, when it is desirable to save the tooth, and when suppuration cannot be prevented, and there is more or less accompanying fever, the internal use of aconite is indicated. It may be given in from one to two-drop doses, of the officinal tincture (always in water) every twenty or thirty minutes until eight or ten drops have been taken, or until there is a marked change in the pulse and temperature.

A HISTORY OF DENTISTRY.

BY GEORGE H. PERINE, D. D. S., NEW YORK.

[Continued from page 345, Vol. 2.]

ENGLAND AND HER EARLY PRACTITIONERS AND WRITERS.

While to France has been very justly ascribed the credit of originating some important professional improvements, and contributing much to the literature of the past century, it must be acknowledged that England was meanwhile by no means inactive, and that to her efforts toward the advancement of the dental art is in a measure due its present elevated position. We find that in 1618 Helkiah Cook, styled "a Doctor in Physick," published in London a book entitled MIKPOKOEMOTPAOIA, which he termed a "Description of the Body of Man, together with the Controversies of Figures thereto belonging, collected and translated out of all the best authors of Anatomy." The writer has devoted five chapters of his work to the description of the teeth and dental organs, and much of his information, and many of his theories were extracted from the writings of Aristotle, Hippocrates, Galen, and other ancient contributors, to whom we have referred. The style of the book is peculiar, and it advances few if any original ideas or improved theories. Prior to the work above alluded to, appeared "The Birth of Mankinde; or, The Woman's Booke, set forth in English by Thomas Raynalde, Phisition, and by him corrected and augmented. . . . Imprinted at London by Richard Watkins, . . . 1568." In one portion of this work instructions are given to enable the reader "to keepe and preserve the teeth cleane." It is doubtful whether the specialty of dentistry was practiced in England as a distinct branch of the healing art before the middle of the seventeenth century. If it was, we fail to find any record of the fact. The first reference to it as an independent specialty we meet with in the diary of the Rev. John Ward, who was Vicar of Stratford-upon-Avon from 1648 to 1679. It reads as follows: "Upon a sign board about fleet Bridge this is written—'Here lives Peter de la Roch and George Goslin, both which and no others are sworn operators to the King's teeth.'"

To Nathaniel Hyghmore the profession is indebted for the discovery of the diseases of the antrum. From his description of that structure, which appeared in one of his works, it derived its name, *i. e.*, Antrum Hyghmore. He was the first to discover that the alveolars penetrated into the cavity, and that they were only separated by a thin scale. He was born in Fordingbridge, 1613, and was educated at Trinity College, Oxford, from which he graduated with the degree of M. D. in 1642. He located in Sherburn, and there practiced his profession. His writings appeared between 1650 and 1657, and though they were not numerous, their value was fully appreciated by the practitioners of his time and those of a later period. He died in the year 1685.

It was during the seventeenth century that science throughout Europe began to make its way to the foreground. Societies of learned men were established, whose experiments led to many valuable results. In England, the writings of Lord Bacon stimulated thought, and taught the men of his time that study and persistent investigation were the keys to the rich repositories of science, and soon the profession of medicine began to receive a liberal share of attention and to assume proportions far beyond its former limits. Thus we find, in 1770, Thomas Berdmore endeavoring to systematize the practice of dental surgery by calling attention to the deformities and disorders of the teeth and gums, through the medium of his able pen. Although his views were somewhat crude, compared with those of to-day, his writings nevertheless exhibited an extensive practical knowledge of the subjects of which they treated. He was the dentist to George III., and died in 1789. The improvements he made in the construction and adaptation of artificial teeth were many, and it was through his activity and ability that the specialty was raised from its comparatively primitive state to a standard of sufficient prominence to attract the attention of John Hunter, whose work, entitled "The Natural History of the Human Teeth, Explaining the Use, Formation, Growth and Diseases," appeared in London in 1771. A second part of the work bore the title : "A Practical Treatise on the Diseases of the Teeth and the Consequences of Them," and appeared in 1778. This work was the first which comprised a full and complete view of the anatomy of the teeth. It also entered into their physiology and pathology to a greater degree, and with sounder judgment and more accurate observation, than any previous production. If it contains defects which render it of little service at the present day, it should be borne in mind that at the time it was written the specialty of dentistry was in its infancy; indeed, comparatively little was known of the physiology of the teeth.

Hunter was perhaps the first to realize the importance of the careful study of the mysteries of nature, and even those neglected members received from him, consequently, especial attention. John Hunter was born at Long Calderwood, about eight miles from Glascow, Scotland, Feb. 13, 1728. Although his early education had been somewhat neglected, he began, at the age of twenty, to feel the importance of knowledge, and accordingly he went to London to assist his brother, Dr. Wm. Hunter, in his anatomical inquiries. Bringing to his task the aid of a fully matured brain and a well developed frame, he was particularly successful in his first efforts at anatomy, and already gave promise of future excellence. His progress in his chosen branch was so rapid that he was very soon established as an under teacher to guide the students in their labors. At this period, Cheseldea had the reputation of being the best surgeon in England, or on the Continent, and to him young Hunter went to take up the study of surgery, for which his intimate practical knowledge of anatomy so well fitted him. Here too he displayed great aptitude and began to shadow forth the great abilities which afterwards made his name so famous.

In 1757 Hunter entered St. Bartholomew's as a surgeon's pupil under Pott, who was then rising rapidly in his profession. From the changes which Pott sought to make in the practice of surgery, Hunter doubtless learned much to aid him afterwards.

In 1753 he entered at St. Mary's, Oxford, as Gentleman Commoner; but the following year found him again in London, and he soon after entered as surgeon's pupil at St. George's.

In 1759 he was attacked with inflammation of the lungs, and was obliged to leave London for his health. He was then appointed Staff Surgeon, and sailed from England in 1761. His first practice with gun-shot wounds was at the siege of Belle Isle. He returned home with the army in 1763. Being now without means, and with no income but his half pay, his life was a laborious one of persevering exertion, mingled with many years of dispute and controversy; for personally he is said to have been rough, almost boorish, and very excitable. To increase his income, he established a school of anatomy and operative surgery, where for many years he delivered lectures upon these subjects; he was not, however, very successful, for his school never exceeded twenty pupils. He devoted his time, his energies, and all his spare money to the collection and preparation of anatomical specimens, and to the advancement of truth. To aid him in this, he obtained possession, by permission, of all animals that died in any of the zoological collections of the country. Not satisfied with this, he sought to study more closely all living subjects—plants and insects, as well as animals. For this purpose, he purchased a small lot of land about two miles from London, where he erected a a building, in which he spent his leisure time studying nature. About this time, also, he had an opportunity to study the reunion of divided tendons, having ruptured the tendon of his own leg while dancing.

In 1767 Hunter was elected Fellow of the Royal Society, the first public recognition that was made of his services as an investigator; and the next year he was elected surgeon of St. George's hospital. This, of course, had the effect of bringing him more pupils, among whom were Jeuner, Guy and Sir Everard Home. In the autumn of 1779 he began to deliver a course of lectures upon surgery before the pupils of St. George's hospital. As a lecturer, Hunter was never popular, and apparently had no natural gift for public speaking; his language was terse and forcible, but inelegant and coarse, while his delivery was unpleasant. His dislike to facing an audience amounted to a disease, and he was obliged to quiet his nerves with laudanum when about to appear before his class. He read several valuable papers before the Royal Society from time to time. He died October 16, 1795, while attending a meeting of the Governors of St. George's hospital.

[To be continued.]

THE FOLLY OF EXTRACTING TEETH.

BY HYMAN ROSA, M. D. S.

[Read before the Third District Dental Society, New York.]

Mr. President and Brethren :

The subject I have chosen for a few remarks is one that should appeal most emphatically to the minds and consciences of *all* honorable people, but particularly to the assembled genius and excellence before me; and, though I may seemingly have chosen a "hobby," I hope to prove a competent rider, or be thrown completely.

History informs us that in the year 300 B. C., Eristratus deposited in the temple of the Delphian Apollo a leaden odontologue, which we should call a tooth-drawer (forceps) "to prove that only those teeth ought to be removed which are loose or relaxed, and for which a leaden instrument will suffice," which in itself, even before the infancy of dentistry, was an argument against the wholesale destruction of nature's most priceless organs.

This was probably the only kind of instrument employed in the extraction of teeth until the invention of Garengeot in the early part of the eighteenth century. As the world grew wiser and greater, the need of a more available instrument for removing teeth became manifest, and the key of Garengeot displaced the rude and imperfect forceps, and no doubt the extracting of teeth began in earnest. For about fifty years the fun continued, and there was not found a country doctor, a city barber, or a traveling dentist, whose saddle bags did not contain the slaughtering turnkey of Garengeot.

The writer well remembers the experience of a Christmas day, twenty years ago when, almost distracted with toothache, he applied to the country doctor for relief. He must needs first go to the barn where he kept his turnkey; then after whetting his jack-knife on his boot-leg, he lanced the gum. A silk pocket handkerchief of goodly dimensions was wrapped around the lever and the murderous key applied to my refractory molar. A dextrous twist of the wrist, and one side lifted—it seemed like one-half of my youthful cranium—then, leisurely removing the key, and changing the hook to fit the other side, he made a final effort and dislodged the tooth, all for twenty-five cents, and no questions asked.

My brethren, think you there would be as many teeth extracted at the present day, if our patients were obliged to become the victims of a like experience?

Until about the year 1830, this was the prevailing mode of extracting *molar teeth,* as the forceps of those days were so rude and awkward as to render their use on any but the anterior teeth very uncertain and even dangerous.

At the present day, however, there is such a diversity of forms, and such perfect adaptation to the requirements of each individual case, that the extracting of teeth has unfortunately become a household word and, when done in connection with nitrous oxide gas, "a glorious revelation!"

When we consider the ravages made by the neglect and untimely sacrifice of the teeth of our American people—a nation leading the world in culture and civilization, a nation of dentists and dental colleges—it is surprising that so little has been written or spoken upon this subject to educate them to a higher degree of appreciation of the usefulness and beauty of the natural teeth over the artificial; to cultivate a habit of careful and thorough watchfulness; to create in the minds of children a spirit of pride and jealousy which shall prompt them to neglect or sacrifice their teeth no sooner than they would their fingers or their eyes ; to have the extraction of teeth the exception rather than the rule, and to brand every dentist and dental association who are concerned in the wholesale destruction of the natural teeth as maliciously mercenary, and subject them to the contempt and disgust of all right-minded individuals.

It is estimated that 20,000,000 teeth are extracted and 3,000,000 artificial sets constructed annually,—what an unnecessary sacrifice, when we consider the vast number which are never replaced and the poor substitutes that are made. The time has been when the surgeon thought he was the best who cut off most fingers and toes, arms and legs, and penetrated nearest to the vital parts of the human frame with merciless cold steel. That day is now past, and the best educated surgeon is he who saves a limb, and restores to usefulness without mutilation. Has not the time come for us to show a parallel improvement in dental surgery? It does not seem quite the thing for men, who have received the liberal education now demanded of dentists, to take their orders from their patients, who are not wise about their denture any how, and whose little stock of common sense is apt to take wings before the pangs of an exposed nerve. No physician would be dictated to by a patient as to whether a finger should be lanced to the bone, and poulticed for a felon, or cut off at the first joint, and so make a speedy end to the throbbing agony peculiar to that species of inflammation.

And, brethren, it seems to me that the dentist should decide for the patient who has been kept awake all night with a demon of a molar, whether the torture should be ended with a forceps, or whether a more mild and conservative treatment, even though extending the period of pain, should be entered upon. It is true, that as the physician finds people who always want to be purged, as Hercules purged the Augean stables by turning the course of the river full into them, and never think they get full value for their money unless the testimony of their bowels is full and copious, so we find patients who would apparently enjoy the dentist's chair much better if each tooth drawn had its roots hooked, or were riveted by exostosis, so that the history of the operation might be handed down as an example of fortitude worthy the emulation of generations yet unborn. It was some such soul as this who despised the dentist that charged him fifty cents for popping a tooth out "*just as easy*," and lauded the blacksmith, who only charged him a shilling, for dragging him all around the shop. It is hard to explain to such minds the value of conserving the teeth. It would probably be of no use to tell him that his natural teeth would masticate his food much better, and save him from the fangs of that internal wolf, called dyspepsia. Perhaps such people are born into the world to suffer, and only by suffering can ideas penetrate their brains. But is there not another class, a much larger class than we have imagined—a class that we must search for to find out, who may be wrought upon, by a proper presentation of the case, to spare themselves and their teeth?

Where there is not personal vanity to work upon in the patient, there should be some common-sense to appeal to, and the dentist, however skillful he may be in mechanical dentistry, should yet pride himself more in his skill in appealing to the owner to spare the innocents, whose place he can fill with lifeless porcelain, so as to deceive the eye of the most observing. Would that I were a poet, to write, not "Woodman, spare that tree," but "Dentist, spare that tooth."

If it be asked whether the author of this essay is inclined to run down mechanical dentistry, or to do away with it, I must answer that there must always be a plēnitude of cases where mechanical dentistry, and it alone, will fill the bill. But the danger at the present time is, that skill in doctoring sensitive teeth, in preparing cavities, in filling teeth, will be lost altogether. The gas-bag, forceps, and the vulcanizer are ready oftenest in the hands of the general practitioner. We are becoming a class of mechanics rather than a profession.

It is in this vein of thought that I have prepared these words for your thoughts to-day. Let us then, brethren of the Third District Dental Society, awake to a renewed appreciation of our duties as dentists. Let us be more steadfast in the conservative department of our specialty, and by precept and example fearlessly do our best to promote such a healthy reaction in the minds of our patients that "pulling teeth" will be a by-word and a reproach among all thoughtful and intelligent individuals.

SOMETHING FOR DENTAL CHEMISTS.

BY CHAS. MAYR.

The action of hydrochloric acid upon the teeth has been the subject of some dispute. Some have claimed that when a tooth is dissolved in hydrochloric acid no decomposition of the phosphate of lime in the tooth takes place. Every dentist, who is educated in chemistry, can repeat the following experiments. If he dissolves a tooth in muriatic acid the equation is this, supposing as practically always the case an excess of muriatic acid; it will help the following explanation:

$$\underset{\text{Tooth}}{\mathrm{P_2O_8Ca_3}} + \underset{\text{Muriatic Acid.}}{\mathrm{12HCl}} = \underset{\text{Phosphoric Acid.}}{\mathrm{2(PO_4H_3)}} + \underset{\text{Chloride of Calcium.}}{\mathrm{3CaCl_2}} + \underset{\text{Excess of Muriatic Acid.}}{\mathrm{6ClH.}}$$

We have therefore in solution chlorate of calcium and phosphoric acid, not considering less important substances like carbonate of lime, magnesia, etc. To prove that really decomposition of phosphate of lime has taken place is very easy. We add two perfectly neutral substances, neither of which would decompose the phosphate of lime: first, acetate of ammonia, and then oxalate of ammonia. The acetate of ammonia serves to transform the free hydrochloric acid into ammonium chloride and free acetic acid; the oxalate of ammonia, to throw down all the lime in solution. We obtain a white precipitate containing all the lime in the tooth if we did not warm.

The chemical equation, somewhat simplified, is:

1. After adding $\overline{\mathrm{Ac}}\mathrm{Amm}$:

$$\underset{\text{Phosphoric Acid.}}{\mathrm{2(PO_4H_3)}} + \underset{\text{Calcium Chloride.}}{\mathrm{3(CaCl_2)}} + \underset{\text{Muriatic Acid.}}{\mathrm{6(HCl)}} + \underset{\text{Ammonium Acetate.}}{\mathrm{12Am\overline{Ac}}} = \underset{\text{Phosphoric Acid.}}{\mathrm{2(PO_4H_3)}} + \underset{\text{Calcium Acetate.}}{\mathrm{3(Ca\overline{Ac}_2)}} + \underset{\text{Ammonium Chloride.}}{\mathrm{12Am\ Cl}} + \underset{\text{Acetic Acid.}}{\mathrm{6\overline{Ac}}}$$

2. After adding $\overline{\mathrm{Ox}}\mathrm{Amm_2}$ (oxalate of ammonia) written in a simplified form:

$$\underset{\text{Phosphoric Acid.}}{\mathrm{2(PO_4H_3)}} + \underset{\text{Calcium Acetate.}}{\mathrm{3(Ca\overline{Ac}_2)}} + \underset{\text{Ammonium Chloride.}}{\mathrm{12AmmCl}} + \underset{\text{Acetic Acid.}}{\mathrm{6\overline{Ac}}} + \underset{\text{Ammonium Oxalate.}}{\mathrm{3(\overline{Ox}Amm_2)}} = \underset{\text{Phosphoric Acid.}}{\mathrm{2(PO_4H_3)}} + \underset{\text{Calcium Oxalate.}}{\mathrm{3(Ca\overline{Ox})}} + \underset{\text{Ammonium Chloride.}}{\mathrm{12AmmCl}} + \underset{\text{Acetic Acid.}}{\mathrm{6\overline{Ac}}} + \mathrm{6Amm\overline{Ac}.}$$

3. If we now evaporate the liquid by heating to dull redness, the phosphoric acid will remain behind, pure and free from any lime. Neither of these neutral salts would have decomposed the phosphate of lime. Even oxalic acid alone would have done so very incompletely; but I think the proof is conclusive that the muriatic acid not only dissolved the lime, but completely decomposed it.

On the right side of our equation we have nothing that is not volatile after filtering off the insoluble Ca$\overline{\mathrm{Ox}}$, except the phosphoric acid.

EDITORIAL.

BARNUM'S RUBBER DAM.

During the last month or two we have received several communications relative to the claim of Dr. W. T. La Roche, as set forth in a paper which he read before the First District Dental Society, of New York, on the 6th of November last. We were urged to publish these in our December number, but declined to do so, hoping that the *journals*, at least, would unite in refusing to give the matter publicity. In this we were disappointed. Consequently, we reluctantly admit a letter, which may be found under the heading of *Correspondence*, giving some of the facts in the case. We have also endeavored to ascertain the full merits of the controversy and shall express ourselves without bias, but decidedly. In so doing, we fully believe we are but expressing the universal sentiment of the profession at large.

We confess to considerable surprise that the chairman of this society, or any other, should have permitted and that the society itself should have good-naturedly allowed the time to be wasted while Dr. La Roche undertook to prove that he used rubber dam in dental operations prior to its use by Dr. S. C. Barnum. We fail to discover any reason for bringing this subject at this late day to the attention of any body of dentists, or of the profession at large. Even if Dr. La Roche, by affidavits and other evidence, is able to convince some of the truth of his claim, it is of no consequence; he does not make it appear that the profession is in the least indebted to him for it. According to his own story, he kept the knowledge of this use of rubber dam within his own office for his own benefit and that of his students for about *seven years*, before the profession in 1864 received the suggestion of its value *from Dr. Barnum*, through Dr. Clowes. Since then, some nineteen years more have passed. The great invention, received at first with hesitation and doubt, after a while began to be appreciated at its true value; Dr. Barnum became famous, receiving many thanks and testimonials from the profession in Europe and America, and for years his name was associated with the rubber in the periodical advertisements for its sale, in the words, "Introduced by Dr. S. C. Barnum." During all this time, until three or four years ago, no one heard any other name than his mentioned in connection with this invention. Dr. La Roche then first, we are informed, made the claim that he knew of and used rubber for a coffer dam prior to

Barnum. Those who heard of it might well have hesitated whether the story might be most charitably regarded as due to some vagary of a recently awakened Rip Van Winkle, or as worthy of credence, which carried with it the conviction of the meanness of a man who knew of such a thing and kept it in his own office, and who, so far as appears, would have kept it there still if he could. He repeated the strange story, with the stranger addition that he told Barnum of the rubber and its use, long before the latter made it known. These statements were very naturally received with doubt, and some even intimated entire unbelief. This so wrought upon the soul of the claimant that, to defend his veracity, he made the public statement with affidavits, not including, however, his claim of telling Barnum, to which reference has been made.

Dr. Barnum's health is probably too much impaired to permit him to publicly defend himself, even if he were not restrained from any such attempt by native diffidence, and we are, on this account, the more moved by a sense of duty to notice Dr. La Roche's assertions.

Dr. Barnum was a student of dentistry in the office of Dr. J. W. Clowes, of New York, from 1858 to 1862, and during the latter year went to Monticello, N. Y., to practice, where he remained two years, returning to New York in April, 1864, to act as Dr. Clowes' assistant. Immediately after his arrival, he informed Dr. Clowes of his recent discovery of a means to keep teeth dry during operations upon them, which was entirely different and far superior to any means then in vogue. The quickly following explanation and demonstration so delighted Dr. Clowes that the too modest Barnum was persuaded to present rubber dam to the dental profession, through the former, at a dental society meeting held in June of the same year, in New York city. Much of what has followed we all know, but there are a few points worthy of consideration in the claim that has been made. Dr. La Roche claims to have invented the rubber dam in 1857. If he did, what of it? During seven years, no dentist outside of his own office heard of it. If it is true, of what interest is the fact except as an example of selfishness? But he has repeatedly made the claim, in conversation, that he showed it to Barnum! Let us look at this. Barnum was a student in Dr. Clowes' office and, for him, went two or three times, between 1858 and 1862, to Dr. La Roche's office in relation to the construction of artificial dentures by the latter, for Dr. Clowes; and it is alleged that upon one of these occasions the information was imparted. Is it not remarkable that during seven years not another person outside that office was let into the secret? that no professional acquaintance was so favored? This young man was the only exception. Then this information, it is to be supposed, was treasured up by the secretive Barnum for two years or more. He did not reveal it to his uncle, Dr. Clowes, during his studentship, but went away to Monticello, to come back after two years with a story of struggling with difficulties and a final surmounting of them by the invention, of which he quickly tells and readily consents to give to the profession. There must have been a wonderful change in Dr. Barnum in those two years if this be true. *He denies* that he ever received any such information. He refuses to admit the possibility of his having been favored, as is claimed, and then of his forgetting it. These are the facts, as we understand them. It is indeed a remarkable story.

Dr. La Roche has made his public statement, we are told, to defend his veracity. We would gently suggest that never since he learned to talk could he have done anything which will cause it to be so much doubted. Those who give credence to his statements, excuse him for keeping it, we are informed, because "he did not think much of the rubber." They cannot then give him credit for either genius or generosity. Young Barnum thought enough of it to claim it as an invention, and Dr. Clowes thought so much of it that it was generously given to the profession.

Blind Samson of old pulled down the heathen temple and perished with his Philistine tormentors, whom he wished to destroy; Dr. La Roche, in attempting to upset the foundations of the temple of Dr. Barnum's fame, has done nothing more than injure himself so as to make an unpleasant revelation of his "in'ards."

[The *Missouri Dental Journal*, Oct. 1870, contains a letter from Dr. Clowes to Dr. Geo. H. Cushing, relating some of the above facts.]

BICKFORD'S DENTAL MOUTH PROP.

Our advertising columns describe this new and unique device. Every operator will find it very helpful, both at the chair and in the extracting room. It is neat, strong, occupies but little space, and possesses many points of superiority over any other prop we have seen. The price is within the compass of any one.

THE JOURNALS.

The October number of the *Missouri Dental Journal* reprints from the *Weekly Medical Review* an article on "Artificial Respiration," giving the method discovered (?) by Dr. A. McDaniel of Alabama. We believe the Doctor claims too much for his method. That the capacity of the thorax is greater while the patient is in an erect than when in a recumbent position, probably everybody will admit. The Doctor's method is based on that fact. He professes to produce artificial respiration by "merely moving the patient from a forward inclination of forty-five degrees to the erect position, and back again." Every upward and backward movement produces an inspiration, and every forward and downward movement an expiration, and the two together constitute the respiratory act, which may be prolonged at will. He further says: "Any one will find that if he leans forward from the erect position to an inclination of say forty-five degrees, he will mechanically and involuntarily perform inspiration. He cannot by any power of volition prevent the result, or reverse it." To become satisfied of the incorrectness of this statement, one has but to go through the motions recommended, and exercise volition against the tendency. We have tried the experiment ourselves, and upon a number of friends, and though the *tendency* is to expire as you move forward and downward, and to inspire as you pass back to the erect position, yet it is readily overcome by slight effort. Possibly the tendency may be sufficiently strong to produce artificial respiration when the patient is in a state of collapse, but the tendency of the tongue to fall back into the fauces must be very difficult to control in Dr. McDaniel's method. Friction and artificial warmth are rightly considered valuable aids in restoring respiration, especially where the circulation is also suspended or very much retarded, as is very likely to be the case. The ease and convenience with which these aids may be used in the "Sylvester method," as compared with the McDaniel method, is apparent to anybody who will compare the two. On the whole, we should expect much better results from Sylvester's method (which we think preferable to Hall's, unless possibly in cases of drowning, where water is to be gotten rid of). Too many methods are confusing, and while we look upon Dr. McDaniel's method as ingenious, and based on a correct apprehension of anatomical structure and physiological function, we think it lacks positiveness, and presents difficulties which do not inhere in either the Marshall Hall or Sylvester methods. If every dentist would arm himself for an emergency of asphyxia, let him familiarize himself with *one good method*, both by study of its theory and by practicing the movements on a friend. Do not get two or three methods confused. Adopt one method, learning what the others are, if you desire; but remember that multiplicity of council is likely to produce confusion and hesitation. A clear head and a prompt and steady hand are needed in all cases calling for artificial respiration.

The *Independent Practitioner* of October contains an excellent article by Dr. W. C. Barrett, of Buffalo, on "An Examination of the Teeth of Certain Prehistoric American Races." The article is very elaborate and highly instructive. We are afraid that those persons who ascribe all failings to modern civilization, will derive not the faintest trace of comfort from this article. Dr. Barrett dispels all illusion in that direction; before the faintest dawn of civilization had even appeared in American skies, there were diseases of the teeth enough to keep the same proportion of dentists alive. Even the grand bugbear, syphilis, was then unknown. "If an exchange of teeth between our generation and the one living long ago could be made, we are afraid we would make a bad bargain." Those fogies who believe in the wickedness of civilization, are mostly those who consciously or unconsciously delight in original sin, depravity of human nature and the like. A man cannot be a fogy in one sense and an advanced thinker in the other; either of the two is not worth much, if he tries to be both, and every little detail in which it is possible to disprove the notions of these men will prove valuable for the general enlightenment of mankind. Dr. Barrett gave a slight extract of his ideas at the Springfield meeting, in June last, but we are glad he has elaborated a little more the ideas he threw out into an independent paper.

Dr. Trueman publishes an able article on the Screw as used in regulating teeth.

Another very able paper is published by Dr. Frank Abbott, of New York, on the "Minute Anatomy of Human Teeth." It is a very good synopsis of the latest discoveries in this line, given by one who is himself prominent in original research.

Dr. Atkinson was at the meeting of the New Jersey State Dental Society, July 19, '83, and, as usual, things were lively. Speaking of the folly of depriving wheat of its nutritive elements for the purpose of having it whiter, he says the following excellent things: "It is hardly fair to state that starch is a detrimental agent, inasmuch as it must be digested in the human body, until it has been converted into glucose." "Anything that is capable of acting on the living human body has either to help or arrest the nutritive changes that are going on and may be, according to the demand and necessities of the human body, either a food, a poison, or a remedy." "The outer husk of the berry of the wheat may be neither detrimental or useless."

The meeting of the Penn. State Dental Society treated as the subject of one of its sessions, Iodoform. Dr. Trueman recommends mixing the iodoform to the amount of one twentieth of a grain for a tooth with a solution of carbolic acid; Dr. Darby speaks very favorably of the application of iodoform over exposed pulps and his experience is favorable. A case was related where iodoform quickly allayed the pains resulting from piles.

The October number of the *Microscope* lies before us. It is a periodical appearing at Ann Arbor, Michigan. Dr. Kellicott gives an account of the proceedings of the American Society of Microscopists. Very often the efforts of microscopists are wasted because of the lack of system in what the microscopist is about to investigate. The microscope taken as a self end is nothing but a plaything; it only becomes valuable when mixed with brains and system.

Dr. A. M. Ross publishes an excellent article on Sensitive Dentine. It is written in a very pleasing style, and is well worth the reading.

Fortunately, after much hard treatment, another copy of *Le Progres Dentaire* has reached us. It is the September number. There is given a continuous translation of the book of Alfred Coleman, and if the French readers cut out the corresponding pages from the periodical, and paste them together, they will have a gratis copy of Coleman's book in French.

THANKS.

"The New England Journal of Dentistry, which has heretofore been edited and published impersonally, in its last number announces its syndicate and publishes the names of its editors. It has a number of accessions to its corps of collaborators and will enter upon its third volume with brighter prospects than ever. The *Independent Practitioner* acknowledges the compliment paid in adopting its method of publication and wishes the New England Journal abundant success. Good as it has always been in the past, we shall expect that it will be better in the future."—*Independent Practitioner.*

Thanks, Dr. Barrett. The "method," however, is *our* patent. We have simply expanded our original method—not adopted a new one.

The *Independent Practitioner* (December) has a very thorough article by that excellent and famous investigator, Dr. W. D. Miller, of Berlin. This gentleman, whose investigating skill cannot be too highly praised, states in a very able manner the way we ought to investigate teeth. He gives the five following methods:

First. The structure and chemical composition of the teeth, and the nature of the agents and reagents by which they are surrounded in the human mouth, are carefully considered, so that we may be able to form an intelligent conclusion as to the probable results produced by their action upon each other.

Second. Carious teeth, both in the fresh and dry state, are in thick sections, subjected to a careful *macro*scopical examination.

Third. The anatomical changes produced by caries in the structure of the tooth are studied on *micro*scopical sections of the various tissues of the tooth.

Fourth. The exact chemical changes which have taken place in the diseased tissues are determined by proper chemical analyses.

Fifth. Pieces of sound tooth tissue are subjected to conditions as similar as possible to those found in the human mouth, for the purpose of artificially producing the phenomena of caries.

The fifth method we should consider slightly dangerous because it contains the very dangerous restriction "as similar as possible." The danger of not knowing when we have reached the greatest possible resemblance is so great that all experiments in this line do not seem to us consistent with the otherwise strictly scientific turn of mind of Dr. Miller. There is missing the great, the all overwhelming influence of the surroundings in which the tooth is placed in the mouth. Such experiments are very much what used to be termed "tooth-pickling." We cannot quite agree with Dr. Miller in what he says in these sentences:

"Up to within a few months the conviction had become pretty general that the first stage of dental caries (if not the whole process) consisted in a decalcification of the tissue of the tooth by various acids. Later, however, a reaction arose in America, the object of which was to replace acids by an agent of a parasitical nature, but no attempt was made to prove that this agent had in reality the power of producing the effects which had previously been attributed to acids. On the other hand, the advocates of the parasitical theory of decay distinctly affirm that no acid is necessary, and that no decalcification takes place in the process of caries. This is the fundamental idea, and at the same time the fundamental error of the germ theory."

It is now two years ago that, at a meeting of the Connecticut Valley Club, the opinion that parasites of a bacterial nature produce decay without necessarily requiring the action of acids, was treated. This possibility was only thrown out, so to speak, as a proposition, either to be proved or disproved. Since that time a great number of experiments have been made, by Dr. Miller especially. And now, after this proposition of bacterial action without acids was put up two years ago, Dr. Miller thinks it has only been published a short time. The difference between Dr. Miller's views and those then broached by our friends and us seems to us to lie in the difference of the meaning of decay. No one will deny that acids produced by fermentation are extremely helpful to decay; but what was claimed then is, that decay properly is a putrefactive process, requiring for its action certain putrefactive bacteria. It may even be said that the investigations of Dr. Miller have rendered it doubtful if the putrefactive bacteria may attack a tooth without the aid of lower organisms producing organic acids out of the particles of food left about the teeth. But this point was never disputed. At least, it was then put up as suggestion that the simple erosion produced by an acid, even if that acid should have originated from fermentation, would not yet be decay. The suggestion as to the attack of bacteria upon a sound tooth has never been as strongly insisted upon as Dr. Miller seems to suppose. It was only proposed as a ground to work upon, and it seems to have taken a good deal of time to reach this investigator, since he now quotes it as a recent view. It was made long before his experiments, and was put up more for a fighting ground than anything else. We might almost, to set at ease the combativeness of investigators, say that it appears very doubtful to us that putrefactive germs can work directly into defective enamel or tooth substance; but this would be giving up a very slight and unimportant phase of our opinions about decay. The only point clearly and well defined, put forth by us and still maintained, is the same for which Dr. Miller fights, namely, that the action which produces decay is, essentially, one of germs, using this term not only for germs of putrefaction but also for germs of fermentation. In this shape the theory has been maintained and defended by the New England Journal of Dentistry, by Dr. F. Y. Clark and others long before the experiments of Dr. Miller. We may have been wrong about details, but in this we most distinctly and on many occasions disclaimed any committal on our part. Dr. Miller's experiments have only convinced us more firmly than ever before of the same proposition. He has done a great deal of detail work, but that detail work has not overthrown the work which we then did on a merely fighting basis. The analyses that were made at the instigation of the defenders of this theory give almost exactly the same results as those of Dr. Miller. We only had to emphasize certain points not yet admitted, namely, that there is still very much lime left in what is called decayed masses. The idea in this country was then that there were no lime-salts left in the decayed mass, and the tendency was to consider decay as nothing but a grossly chemical process. This view we combatted and still combat, and the whole profession testifies indirectly in favor of our theory by using carbolic acid in the treatment and manipulation of decay. We can say, without opposition, that carbolic acid does not neutralize the acid but works against fermentative and putrefactive changes, both of which we now know are due to micro-organisms. The passages,—"They simply show what, until recently, had so long been looked upon as a settled fact, and what must at once suggest itself to every man who has ever excavated a carious tooth, that a tolerably thorough decalcification of the dentine takes place in caries; that the extent of the decalcification decreases as the distance below the surface increases (it could not well be otherwise); that on the border of the normal dentine the decalcification is comparatively slight, and that the same characteristics are presented by dentine softened in a mixture of saliva with various articles of food, as by carious dentine,"—might have with only a slight modification, been written by us some two years ago. The only point of difference to us seems to be the explaining of results. The following propositions as results of investigations of fermentation may be interesting to many of our readers.

First. The contact of saliva with amylaceous or saccharine food, (not to speak of nitrogenous food), or a solution of sugar or starch in saliva, kept at body temperature, invariably gives rise in four or five hours to a strong acid reaction, due to the generation of an organic acid.

Second. There must consequently be in the human mouth a constant though variable generation of acid, because of the impossibility of keeping the mouth perfectly free from food and from solutions of amyloid in saliva, which penetrate cracks, pits and fissures, or are held by capillary attraction between the surfaces of teeth in contact, and there become acid by fermentation.

Third. The degree of acidity depends somewhat upon the length of time which has elapsed since partaking of food, and will be found greatest on rising in the morning.

Fourth. A cavity of decay in which saccharine or amylaceous food has remained for some hours, must and will be found, always and without exception, to have an acid reaction.

Fifth. The extent to which any tooth suffers from the action of the acid depends upon its density and structure, but more particularly upon the perfection of the enamel and the protection of the neck of the tooth by healthy gums. What we might call the perfect tooth would resist indefinitely the same acid to which a tooth of opposite character would succumb in a few weeks.

Sixth. An occasional possible absence of an acid reaction in a cavity of decay is no indication that acid has not participated in the production of the cavity. Little or no value can be attached to tests of the saliva alone.

Seventh. Any general or special disorder or condition of the system which results in the withdrawal of lime-salts from a tooth, or in a lowering of its density, or in a weakening of the chemical union between the organic and inorganic matter of the tooth, renders it more liable to decay.

Eighth. Strong acid and corroding substances brought but momentarily into the human mouth, may give rise to lesions of the enamel at points where the ordinary agents alone could never have begun.

Ninth. All the *macro*scopical appearances and characteristics of caries may be produced with the greatest exactness *out* of the mouth, simply by subjecting teeth to those acid mixtures which are constantly to be found *in* the mouth.

Tenth. The superficial layers of carious dentine undergo an almost, if not absolutely complete decalcification, which decreases as we approach the normal dentine. The same is true of dentine decalcified in saliva and bread.

Eleventh. The destruction of the organic constituents follows (not precedes) the decalcification, and is evidently for the most part to be ascribed to the action of fungi.

Twelfth. The fungi found in the human mouth do not participate *directly* in the process of decalcification. The exact part which they perform in the production of an acid reaction requires further investigation.

Thirteenth. The fungi produce the most manifold anatomical changes in the softened dentine, resulting in the complete obliteration of the structure and final disappearance of the tissue in a mass of debris and fungi.

Fourteenth. The invasion of the micro-organisms is always preceded by the extraction of the lime-salts.

Fifteenth. The destruction of the tissue remaining after decalcification is effected almost wholly by fungi alone.

Sixteenth. Inflammation can hardly be looked upon as a very important factor in caries of the teeth.

Seventeenth. Caries of the enamel is purely chemical, the decalcification resulting at once in the complete dissolution of the tissue.

Eighteenth. Caries of cement runs a course analogous to caries of dentine, a softening of the tissue by acids, and following this its destruction by fungi; a slight inflammatory action on the part of the living matter in the corpuscles is not to be excluded.

That a microscopist like Dr. Miller should consider macroscopic appearances of such value is slightly astonishing. They are so apt to mislead us and not quite admissible at a time where, as Dr. Miller himself has proved by his experiments, the microscope is many degrees beyond any macroscopical research.

M.

THE DENTAL ART AS VIEWED BY A FRENCHMAN, DR. GASPARD GUILLOT.

Dentistry, until not long ago, was looked at in France as on a level with the professions of barbers, chiropodists, wart-doctors and veterinary surgeons. Dr. Guillot says that in France even aeronauts practice dentistry. To impress his readers with the necessity of doing something for dentistry, he gives the following synopsis of the present status of dentistry all over the civilized world. We think it is worth reading. As a genuine Frenchman, he says: The superiority of the Americans would not remain long, if rote would not spread itself so much in France, and if all spirit of enterprise were not crushed out by the burden of governmental supervision.

"The United States were first in founding dental colleges, and England soon followed. This nation lately commenced to raise the dental profession by requiring of the students entering into the dental school a scientific foundation very different from that formerly demanded. The title of D. D. S. is given to the graduates of the colleges of the United States; that of L. D. S. to those of old England. The considerable material in these institutions and the diplomas given by the faculty are the cause that these colleges send out well-trained graduates, capable and armed for the fight; hence, their superiority, which would not shine long, if rote did not spread itself so much in France, and if all spirit of enterprise was not crushed under the weight of governmental supervision.

Belgium is somewhat like France, at least, as we believe, without regulations. The women as well as the men exercise this profession there, as in France, without control. Holland, her neighbor, required diplomas, but finding these insufficient, she actually demands that all professionals in the art of dentistry be Doctors in Medicine.

A number of Israelites, who practiced the art of dentistry in that country, not feeling themselves capable of attaining this height, went to Belgium, who perhaps will send them to us, if she comes to imitate her neighbor.

Spain, the country so far behind in the opinion of our politicians, compels her dentists for many years to pass severe examinations before boards of health composed of Doctors of Medicine.

Russia imitates Spain in this.

In Italy, we believe, the examinations are optional, but we dare not affirm it. At any rate, the dental art has taken such a development that it soon will be regulated.

Germany and Austria, without possessing what we would properly call dental colleges, have in many of their universities Professors of Odontology, whose lectures are well attended. The examinations to practice the profession of a dentist are very severe, and the candidates with the title of "Practischer Zahnarzt" (Dental Physician), must have a great amount of knowledge and experience to be admitted by the commission to practice the profession.

Switzerland, the little country of twenty-two cantons, is worthy of being mentioned, specially in regard to the examinations which are demanded from dentists. As a general rule, no one can practice the profession of dentist in any canton, without, in the first place, having passed a satisfactory examination before the health commissioners of the canton who grant to him this right. The examinations are not the same for all the cantons, and this is to be regretted. Some are theoretical and practical at the same time, others simply theoretical; hence, of more or less value to the candidate. For this reason, it is also difficult for a dentist to practice in whatever canton he pleases. Certain cantons admit the equality of the examinations; others reject them. However that may be, the principle is good. It would evidently be preferable that, like the candidates for Doctor of Medicine, they should pass a federal examination which would confer on them the right of practicing in whatever part of Switzerland they may choose. Switzerland is endowed with a dental college, supported by the state, and situated in the canton of Geneva. We cannot say what its future may be, but we can say, at present, that it loses for us its title of college for the single reason that it makes an unqualified competition to the dentists of the country. We will not speak of the faculty, among which there is but one single dentist, capable, that is true. Since we graduated from the dental college of Geneva, we have had a number of pupils which, after passing good examinations, have practiced dentistry.

France is thus almost isolated in this, as many other things, among the European nations, and is outside of that scientific orchestra in which she might easily enter and soon become the leader (!) Four years ago two societies, having for their purpose the defense of professional interests, were formed at Paris: The Odontological Association (societé syndicale odontologique), and the Dentists' Club (Cercle des Dentists). Each one had a publication of its own; one was the Gazette Odontologique, the other soon died. These two societies did not agree, and failed to utilize the excellent resources for the establishment of a dental college. The Dentists' Club founded a weak school and polyclinic, which is now in its third year. The two years required there from the pupils do not seem to us sufficient. All such schools in France do not prosper unless under governmental protection. One might object to us that in the United States one may be D. D. S. in two years and even in six months, as we know. Is that exactly a raising of the profession? And how many of the hosts of "American dentists," who swarm all over the globe, are truly capable? Few, very few. We know that from a good source; the deserving and solid men remain in their own country where they are highly honored and consulted.* The other association is trying to establish dental chairs in all the medical colleges. The present practitioners in France are greatly opposed to all dental schools.—*From Le Progres Dentaire, Sept. '83.*

INTERESTING.

Dr. Miller of Berlin writes to Dr. Barrett recently, as follows:

"I have discovered and successfully cultivated a fungus *always* present in the human mouth and in carious dentine, whose development is, under proper conditions (such as are constantly found in the mouth), always accompanied by the production of a strong acid. I have also determined the conditions favorable and unfavorable to its development and have nearly finished the analysis of its acid. To ascertain this I have made over *three hundred* experiments and cultures. I am very hopeful that this will furnish a key to the solution of the whole problem."

But what if he should thus prove that "micro-organisms" *are* "the essential factor in dental caries" after all. We are glad that the "bug" that carries an acid bottle is discovered at last. We were sure he was there. But, hold a moment! Which is *primary*, the acid or the "bug?"

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*As the opinion of the author we only translate it without indorsing or contradicting it.

MASSACHUSETTS DENTAL SOCIETY.

The nineteenth annual meeting of this society was held at Codman & Shurtleff's hall, Boston, Dec. 13 and 14. The attendance was large and an excellent programme was successfully carried out. The several sessions were called to order promptly by the president, Dr. F. Searle, of Springfield, the first of which was entirely devoted to routine business. In subsequent sessions, papers on the following subjects were read: *Reminiscences*, by Dr. J. T. Codman; *Regulation of Devitalized Teeth*, by Dr. S. F. Ham; *Modes of Operating*, by Prof. Thos. Fillebrown; *Early Treatment of the Teeth*, by Dr. G. F. Eames; *Salivary Glands*, by Dr. E. S. Niles; *Oral Deformities*, by Dr. H. A. Baker; *A Review*, by Dr. D. M. Clapp; *Brown's System of Crown Setting*, by Dr. E. Parmly Brown.

The sessions closed with a clinic—Contour Approximal Fillings without Previous Separation—by Dr. Brown. With the exception of Dr. Baker's, the papers were followed by very little discussion. In future numbers we hope to print most, if not all, these papers and bring out the chief points of interest in the discussions.

The officers elected for the ensuing year are as follows, viz: President, Dr. D. M. Clapp, Boston; First Vice-President, Dr. J. F. Adams, Worcester; Second Vice-President, Dr. S. G. Stevens, Lynn. Secretary, Dr. W. E. Page, Boston. Treasurer, Dr. E. Page, Charlestown. Librarian, Dr. R. R. Andrews, Cambridge. Executive Committee, Drs. G. C. Ainsworth, Boston; Leon Rideout, Lynn; J. S. Hurlbut, Springfield; H. A. Baker, Boston; E. F. Whitman, Boston Highlands.

Dr. J. A. McClelland, in behalf of the Chrolithion Dental Co., presented a new material for mounting artificial teeth, called the "Rose-pearl Base." This material resembles very much in appearance celluloid, but the claim is made that its color is much less liable to become impaired by use. We understand that it is soon to be placed upon the market.

There were many features of interest in connection with this meeting which marked it as one of the best in the history of the society. Many of the papers read were noticeably of a highly advanced order, clearly showing that this society has among its members not a few who may be justly classed as representative of the progressive spirit of the times. Time, place, etc., of the next semi-annual meeting was referred to the executive committee.

EARLY TREATMENT OF THE TEETH.

The Southern Dental Journal, published at Atlanta, Ga., is fortunate in having a contributor, Mrs. M. W. J., who is writing a series of "Letters from a Mother to a Mother, on the Formation, Growth and Care of the Teeth." We are pleased to know that these "letters" are to appear in book form. They are very nearly the ideal of what every dentist wants to distribute among his patients, especially the *mothers*. We can scarcely conceive of a better way to "educate the public" regarding the importance and methods of a proper care of the teeth. They go back of the brush, silk, tooth powder, washes, etc. They deal with teeth in the intraüterine life, *the* important time to commence the "care of the teeth."

Next month we shall publish a paper read before the Massachusetts Dental Society, at its late meeting in Boston, by G. F. Eames, M. D., D. D. S., on "*Early Treatment of the Teeth*," and expect that this will be followed by a series of papers by the same author, who has made this important subject a special study. We bespeak for them a careful reading.

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Will our old subscribers kindly remit *promptly* for 1884?

We are sorry to learn that the *Missouri Dental Journal* will cease to exist with the December number. This number (Dec.) closes the fifteenth volume, and it has long been known as one of our best journals. That the "West" should let it die "for want of support" does not speak so well for that section of country as we could wish.

Dr. Claudius, of Grenoble, France, furnishes a good point to tame unruly children. He advises us to say, "Now, my little darling, please sit still and keep your little mouth very pleasantly open, otherwise it takes too much time, and as I charge in my operations in proportion of time, it will cost much, and your dear parents will lose unnecessary money." Even the weakest parents, when they hear that speech, muster up courage and exert their authority, and out goes the tooth. The author thinks that a tariff for dentists might be a good thing in Europe.

A professor in Würzburg (Germany), has made the first resection of a part of the stomach, because of cancer. The operation, in which a considerable portion of the stomach was removed, has been crowned with success.

Dr. Cheize describes a simple method of producing local anæsthesia. In a case of ingrowing toe-nail of the big toe, he had no apparatus near and immediate operation was required. A piece of cloth was moistened with ether and put on the toe; he then blew with a common hand-bellows a current of air over the cloth, and the cold produced by the evaporating ether soon produced complete insensibility. After repeating this manipulation three times, the nail could be removed without the slightest pain to the patient. This method might be applied to opening boils, etc.

SOCIETIES.

The second annual Commencement Exercises of the Dental Department of the University of California were held with those of the Medical Department at the Baldwin Theatre, San Francisco, Cal., Tuesday evening, Nov. 13, 1883.

The literary exercises were as follows:

Address on behalf of the Medical Department, by Prof. R. B. Kane, M. D., M. R. C. S. I.

Address on behalf of the Dental Department, by Prof. C. L. Goddard, A. M., D. D. S.

Valedictory on behalf of the graduating class of the Dental Department, by W. E. Price.

Conferring the Degree of Doctor of Medicine, by President of University, W. T. Reid, A. M.

Conferring the Degree of Doctor of Dental Surgery, by President of University, W. T. Reid, A. M.

Administering the Hippocratic Oath to the graduates of the Medical Department, by Prof. R. Beverly Cole, A. M., M. D., M. R. C. S., Eng., Chairman of Faculty of Medicine.

Address on behalf of the Alumni Association of the Dental Department, by G. W. Sichel, M. D., D. D. S.

The following candidates received the degree of Doctor of Dental Surgery: John Nelson Blood, Charles Boxton, Maria A. Burch, Edwin Overton Cochrane, Russell Hopkins Cool, Milton Francis Gabbs, William Edmund Price.

The number of matriculates for the session was twenty-six.

The next session will begin Feb. 1, 1884, and continue till the last of October, 1884.

S. W. DENNIS, M. D.,
Dean of the Faculty.

CONNECTICUT VALLEY DENTAL SOCIETY.

The following officers were elected at the annual meeting held in Springfield, Mass., November last:

President, A. M. Ross; First Vice-President, G. L. Parmele; Second Vice-President, S. B. Bartholomew. Secretary, W. F. Andrews; Assistant Secretary, G. A. Maxfield. Treasurer, W. H. Jones. Executive Committee—Geo. A. Maxfield, F. W. Williams and A. F. Davenport. Section Committees—Section 1, E. S. Niles; Section 2, E. O. Wilbur; Section 3, C. Fones; Section 4, L. D. Shepard; Section 5, E. A. Stebbins.

The committees are appointed by the president.

W. F. ANDREWS, *Sec'y.*

CORRESPONDENCE.

HONOR TO WHOM HONOR IS DUE.

As soon as an invention or discovery is proved by the test of time to be valuable, rival claimants to the honor of having been the first to use it are apt to appear. By some, Morse is charged with having stolen his idea which led to the introduction of the electric telegraph from a gentleman who was a fellow passenger with him on a west-bound ocean steamer. We know, too, that the first use of the anæsthetics, nitrous oxide, ether and chloroform, was claimed by no less than three different men, and many other examples of rival claimants to valuable inventions must occur to all minds. For years the name of Barnum has been so closely associated with the rubber dam as its discoverer and introducer, that the practitioner of dentistry has supposed that the honor of that very valuable discovery, at least, was correctly placed. Therefore, it was a sort of bomb-shell which Dr. W. T. La Roche threw into the First District Dental Society camp, at their regular meeting on Tuesday, Nov. 6th, when he read a paper in which he claimed that he both used and demonstrated to others the use of the rubber dam as early as 1858, substantiating his claims by sworn statements of patients and students who were either operated upon or present during such operations. To some members of the society it seems strange that Dr. La Roche did not then introduce the dam to the profession at large, and that he should have waited till this very late day before claiming to be its discoverer. One member, who had an office very near, even charged him with meanness for not having been liberal enough to tell his near neighbors, at least, of the great discovery. We all remember, however, that the dentist of 1858 was not the dentist of to-day; if he had a good thing he stroked his chin and kept still about it; and, moreover, Dr. La Roche was not living in New York city at that time, seldom if ever attended dental meetings, and proves by a certificate from a physician of good standing that his eyes were under treatment for many months, during which time he read nothing and knew not of Dr. Barnum's claims until they had long been made. It is natural that Dr. La Roche should wish to place himself right before the profession and get the credit due him, and he possesses such a high standing as an operator and gentleman that his assertions, late as they are, must meet with respectful consideration. Still, admitting all that Dr. La Roche claims, Dr. Barnum was the real introducer of the rubber dam, and to his ingenuity and generous kindness in revealing his great discovery we owe what we owe.

D.

MONTHLY LIST OF PATENTS.

Inventions relating to Dentistry, and Surgical Interests, bearing date Nov. 20, 1883. Reported expressly for this journal by Louis Bagger & Co., mechanical experts and solicitors of patents, Washington, D. C.

287,761—Dental engine hand-piece. W. A. Johnston of Clifton, A. W. Browne of Westfield, N. Y., E. Starr and J. W. Gilbert of Philadelphia, Penn.

287,642—Medicated soap. J. J. Dillard, Eureka Springs, Ark.

288,499—Dental engine hand-piece. S. R. Screven, Philadelphia, Penn.

THE

NEW ENGLAND

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Vol. III. FEBRUARY, 1884. No. 2.

ORIGINAL COMMUNICATIONS.

EARLY TREATMENT OF THE TEETH.

BY G. F. EAMES, M. D., D. D. S., BOSTON, MASS.

[Read before the Massachusetts Dental Society.]

The paper which I have been invited to present is a slight modification of one presented to the Maine Dental Society, at its meeting last July, and I now respond in the hope that the effort, although of little value in itself, may lead to a line of investigation the results of which shall be worthy of the profession which we love, and whose lofty ideal we should ever strive to comprehend.

It is not the object of this paper so much to discuss particular methods of procedure as to indicate general principles, and to set forth the need of giving more attention to this subject, as one of the indispensables in the salvation of teeth in the adult.

Let us notice some of the reasons why this branch of our professional work is so much neglected: First, a prevailing dislike for this kind of work. Second, the apparent difficulty of obtaining full compensation for services thus rendered. Third, a want of appreciation and of information on the part of the public, and as a consequence, little or no demand for our services in this direction.

As to whether these reasons are sufficient to account for the inactivity in the profession, or whether we actually need quickening in this direction, let a healthful conscience answer. Have we a just conception of the object of our calling? If we answer in the affirmative, we must qualify it by the assertion that we fear that it has often been allowed to slumber; and as to the demand on the part of the people, it is doubtful if there is one in ten thousand having a proper conception of what should be the highest object of dental ambition. Why do we see so many young ladies bestowing the greatest care upon their personal appearance, with the exception of an utter disregard for the teeth, which in consequence, are most repulsive to the sight? Sad enough is the fact that, in this enlightened age, when nature and art are made a subject of so much study, so many are found who do not appreciate that in which our most ancient writers found so much to praise. It is because individual tastes in this direction are depraved in consequence of the false teachings of ignorant and unprincipled quackery, and we should remember that while one of such a class is allowed to practice in our midst, it will destroy very much of the good teaching of our best dental educators. There is a responsibility connected with this state of ignorance among the people. It is not necessary to inform an enlightened profession where the responsibility lies.

While the educated and enlightened have been inactive, the "evil one" has been intensely active. The *quack* is abroad in the land, and woe to the natural teeth having the slightest pretext for extraction. The willing charlatan finds too many willing victims to his abominable work. Young ladies with irregular teeth, and numberless other cases with remediable conditions, all fall a sacrifice to these nomadic imposters. Visit the places where they thrive, and you will find three-fourths of the adult females wearing artificial teeth. Shall this disgraceful practice exist side by side with intelligent and conscientious practitioners and among a law-abiding people? We cannot now predict its *entire suppression*, but we *can* pledge our united *efforts* for the attainment of this object. Much in this direction can be done while at work in the operating room—a word thrown in here and there—words of explanation, and words of condemnation, if necessary. Too often we have failed to use the latter, when from a misconceived notion of professional etiquette, we would not slander a brother dentist. Let us remember that so-called dentists are not our brothers in the sense in which this term is usually taken. There is a large proportion claiming citizenship in professional territory whose claims tend to destroy the very foundation of our profession, whose teachings are in direct opposition to those principles which insist upon the preservation of the natural teeth, and whose ignorance never dreams of such treatment as would nourish the first deposit in epithelial formation through its successive changes to the completely developed tooth.

Instruction must be conveyed to the people, and it should not be considered unprofessional to give lectures designed to instruct the public in these matters, and in this way much can be said which we could not say privately in the office, for fear of giving offense. We are disposed to shun public lectures upon these subjects because they savor so largely of quackery, but shall we allow its advocates to rob us of an instrument capable of producing such good results? Of course, care and judgment are necessary to secure the best results; and to avoid the appearance of charlatanism, for instance, I would suggest that the lecturer should not speak to the people among whom he is practicing, but that exchanges be made between different towns and cities. Thus far we may draw two conclusions as being essential to the attainment of our object. 1. Ostracize the quack; 2. Give sound information to the people. What sort of information is most needed? Two things I would emphasize, viz: Instruction in the various methods of cleansing the teeth; also, impress upon the patient the fact that dentists are now qualified to treat systemic conditions influencing the nutrition of the teeth, and that they should therefore be called upon to treat these conditions. The patient cannot always be relied upon to decide or know when the services of a dentist are required. This difficulty may at once be removed if we can secure from our patients regular and frequent visits.

How early, or at what period of life shall treatment of the teeth begin? We answer, as soon as tooth material begins to be deposited in the development of the fœtus in utero. Every dentist of experience knows and regrets the sad effects of child-bearing upon the teeth. He has a patient in whom he takes much pride—a young married woman in good health, and the happy possessor of a full set of natural teeth. She visits the office regularly twice a year, and the dentist finds but little to do each time, and he confidently assures his patient that with proper care, her teeth will last a life-time. But the visits of this patient are interrupted; nothing has been heard about the case for months, when the information reaches the ears of the dentist that she has become a mother. Days pass by, and perhaps a year or more (very often more) from the last visit, the patient makes her appearance. An examination of the mouth shows the ravages of decay—the secretions altered and tooth structure weakened. It is plain that such interruptions should not occur, that the dentist should be constantly informed as to the condition of his patient, and in a case like the one just mentioned, the patient should be taught that her condition is not an excuse for neglecting the teeth, but that examinations should be even more frequently made than before, and that when a visit to the dentist is unpleasant or impossible, he should visit the patient at her home.

Perhaps this case is overdrawn to represent the *average* patient, but the importance of supplying the drain upon the system of the mother *cannot* be over-estimated. If the demand for bone material has exceeded the supply in the mother, it is a fair conclusion that the supply has been limited to the fœtus and to the infant. In other words, there is either a lack of the bone-forming elements in the child's system, or the power of assimilation is deficient. Let these losses be supplied, together with good hygiene, and we have thereby a most effective remedy for diseases of the dental organs. In order to employ these measures, the practitioner must of course have full control of his patient, which is often the most serious obstacle in the way to success.

It is thus evident that if medicine and advice are to be administered with effect, it must be done while the organs are being formed or during the growing period. But this is the time when least of all the dentist gains access to his patient, for it is still true that very many avoid his office until actually obliged to seek relief from pain.

In some of the very few articles bearing on this subject, it is recommended that the teeth of children should be examined as early as the second year. This, as you may perceive, *may* be too late. Bone-forming elements have been already deposited; the temporary dentition is or should be complete; a scrofulous tendency, or other hereditary taint, may now have accomplished a work the effects of which may be lasting, or overcome only by a long period of treatment. Let us secure to our patients the ounce of prevention in the way which I have tried to indicate, viz: To begin with the mother; if the secretions of the mouth are abnormal, and there are evidences of denutrition, the proper remedies, with careful instruction, should be at once given. If the patient be then under the care of her physician, a consultation should be held, and some compatible decision reached. After birth, if the child is not properly nourished, it should be fed largely through the system of the mother, aiming to supply the lime-salts and their perfect assimilation. The child should come under the eye of the dentist at regular intervals, whatever the condition of health. It is a very easy matter for the nurse to take the infant to the office, as she takes it out for an airing. Having secured regular visitations from our little patient, indications are to be met as they arise.

The question of lancing the gums, extraction, food and medication, would occupy too much space if discussed in this paper. I wish, in conclusion, to say that I have indicated no line of treatment but that which I believe can be practically carried out. I have little patients of four or five years who look forward to their visits to the office with pleasure. I never intentionally deceive children, or anybody else. Contrary to the rule with some practitioners, I administer anæsthetics to children. I may take a little time to *amuse* children, and count it time gained. It is best to give very short sittings—from fifteen to twenty minutes each, and this is as long as the dentist usually cares to work for such patients.

We cannot too rigidly insist on the early and thorough use of the tooth-brush. While the nurse would scorn to neglect to wash the child externally every day, yet she with impunity omits to brush the teeth, which we should teach as being equally important and conducive to health. This should be done as soon as the teeth are erupted, the mother or nurse using the brush for the child until of an age when capable of using it for himself.

You perceive that the line of treatment hinted at requires a knowledge of medicine, and such requirements are now being realized and fulfilled. Strictly mechanical dentistry is being given to those who will give special attention to that branch, and as we study dental science as a medical specialty, and find our knowledge of that science increasing, new fields for research will thus be opened, requiring more and more attention from the practitioner, until his time is all taken in the study and practice of dental medicine in its truest sense. When that time comes, as the oculist writes a prescription for glasses, and as the aurist prescribes instruments to assist in hearing, so the dentist will indicate in his prescriptions the various mechanical appliances and filling materials needed for the case in hand—although we hope that *such* prescriptions in dentistry will be very rare, when the "early treatment" is carried out to its fullest extent.

I am fully conscious that I have merely touched upon some phases of this subject. Nevertheless, I shall indulge in the hope that it may serve to kindle a flame, which shall not only consume the evils that obscure our vision and obstruct our pathway, but act as a cleansing and purifying influence to such an extent that an attempt like the one I have made in your presence shall be wholly unnecessary.

A HISTORY OF DENTISTRY.

BY GEORGE H. PERINE, D. D. S., NEW YORK.

[Continued from page 19.]

Advance of the Specialty in England, and its Present Status.

The work of Hunter stimulated others who, by their own researches, were able to correct the errors into which he had fallen, to write upon the teeth. They were, however, generally obliged to acknowledge themselves indebted to their worthy predecessor for many valuable hints derived from his book. Among these we have two names which should never be permitted to sink into oblivion—those of Blake and Fox.

Robert Blake was the author of "The Formation and Structure of the Teeth in Man and Various Animals." It was published in Edinburgh, in 1798, and in it the writer called attention to some of Hunter's errors which he endeavored to correct. It was considered one of the best physiological works on the teeth which had appeared up to that time. Errors of opinion not unfrequently, however, occur in the work, but it still continues, notwithstanding, to hold a prominent place in the literature of odontology.

Among English surgeons belonging properly to the eighteenth century, although his first work did not appear until the beginning of the nineteenth, none stood higher than Joseph Fox. He was born in 1776. But little is known of his early history. It is however supposed that he was engaged for some time as dresser for McKline, a surgeon of St. Thomas hospital. How he obtained his practical knowledge of dentistry we are not informed, but he alludes to the great desire of the students to obtain particular information concerning the diseases of the teeth, and which his knowledge of dentistry enabled him to satisfy.

In 1799 he delivered his first course of lectures, on the structure and diseases of the teeth, and so well were they received that they were continued as one of the spring courses of lectures in Guy's hospital. In 1803 his book, "The Natural History of the Human Teeth," appeared. Although Fox was much indebted to Hunter and Blake for information yet, in many instances, he corrected errors and improved and enlarged upon their theories. One important discovery of his corrected an error into which both of his predecessors had fallen, namely, their impression regarding the non-vascularity of the membranes surrounding the pulps. These, by injections, in which he was very successful, he proved to be vascular.

Fox also informs us as to the causes and means of preventing irregularities of the teeth, concerning which he was thoroughly versed. His theories have been borne out by half a century of practice. He also wrote of the diseases which attend dentition, with care and evident acquaintance with the subject.

In 1806 he published the second volume of his work entitled, "History and Treatment of Diseases of the Teeth, Gums, and the Alveolar Process." Both works were for a long time regarded as authority on the subjects upon which they treated, and as late as 1846 an edition was published in Philadelphia. Fox was particularly admired for his enlightened mind, his energetic character and liberal heart. He died at London, April 10, 1816.

Although a few treatises upon the subject followed the works of Hunter, Blake and Fox, it was not until the appearance of Bell's work upon the "Anatomy, Physiology, and Pathology of the Teeth," in the year 1829, that dentistry in England may be said to have attracted any particular attention, or to have been studied as an important branch of medicine.

Thomas Bell was a man of profound physiological and pathological observation and acquirement in the department of anatomy. Although some of his theories have been questioned by modern writers, they are considered generally sound, and the ability and careful research necessary to the combination of a work such as his are universally admired. It is regarded as one of the most valuable works upon the teeth ever issued by the English press. It passed through three editions in America, and will always hold a high place in the literature of the profession.

Among the trans-Atlantic names worthy of memorial record, none can claim a more honorable mention than that of Thomas Bell, F. R. S. The son of a distinguished surgeon in Dorsetshire, England, and born in 1792, he early commenced with his father his professional studies and, before the age of twenty, entered the London hospital contemporaneously with Sir Astley Cooper, and other famous surgeons of that period. In 1815 he passed the College of Surgeons, and two years later began lecturing at Guy's hospital on the Anatomy and Diseases of the Teeth, and was appointed dental surgeon of that institution. For many years he enjoyed, in London, not only a large and select dental practice, but attained a very high position in the scientific world. Honors, offices and endowments signalled his professional career. He was made professor in King's College in 1836, Fellow of the Royal Society in 1838, Secretary of the same from 1848 to 1853, when he was elected President of the Linnæan Society, Honorary Fellow of the Royal College of Surgeons, and one of the examiners in Dental Surgery. He was distinguished as the author of many scientific works. Having for some years retired from practice to live on his estate in the country, he ended his long and honorable life of four-score and eight years on the 13th of March, 1880.

In 1822 Alexander Nasmyth commenced his professional studies in Edinburgh with his brother Robert, who was a successful practitioner. From Edinburgh he proceeded to Paris and placed himself under the eminent dentist, Audibran, whose mode of practice he carefully noted. He some years later located in London where, in 1831, he received from the Royal College of Surgeons a diploma. He published several dental works about 1839, which stamp him as a man of extensive research and high scientific and literary attainments. Through the appreciation of his professional abilities he was appointed dentist to the Royal family. He died suddenly on the 3d of August, 1849.

In 1836, John Tomes, of London, issued a work "On the Structure of the Teeth, the Vascularity of those Organs, and their Relations to Bone." Tomes is believed to be the first in England to write upon the structure of the teeth. In addition to the confirmation of Parkinje and Retzius, Tomes gives new points establishing the vascularity of the tubular structure.

His son, Charles, following in the footsteps of a worthy father, has won for himself a proud position in the profession through his ability as a practitioner, lecturer and writer. In the latter capacity, he has produced an able work in his "Tomes' Dental Anatomy," through which odontological knowledge has been much augmented.

Simultaneously with the elder Tomes' first volume, appeared one from the pen of Richard Owen on the Structure of the Teeth. It comprises two volumes which are embellished with 168 beautiful plates, fully and clearly explained. It is acknowledged to be the most comprehensive work which has ever been published on the subject. It must be acknowledged that to Mr. Owen the profession is greatly indebted for an increase of knowledge, particularly so far as the development and general microscopical structure of the teeth is concerned. He was a member of the Royal College of Surgeons, and is said to have been remarkably successful in all operations of a surgical nature. In 1836 he was appointed Hunterian Professor of the college with which he was connected. His remarkable talent and persistence in professional research have been productive of results which will inure for his name a prominent place in the history of the profession.

Next in order comes Jas. Snell who, for many years, occupied a prominent position, by reason of his skill in practice, and the advanced and enlightened views he gave to science in his work which made its appearance in 1831. It was entitled "A Practical Guide to Operations on the Teeth," an American edition of which appeared the following year.

James Robinson was a student at Guy's hospital and the London University, where he gave much of his attention to the study of the physiology of the teeth. He was born at Hampshire in 1813. In 1830 he commenced business in London as a chemist, but very shortly thereafter his inclinations led him to adopt the practice of dentistry, in which he soon acquired an extensive reputation for dexterity and skill. His characteristic energy and activity were fully displayed in the zeal with which he labored to promote, elevate and advance his profession, by means of organized education and association. In 1842 he made strong efforts to establish a dental society which, owing to the general apathy which prevailed in professional circles, were rendered futile. His work entitled "Robinson on the Teeth," is an authority and has had a large circulation. His articles furnished to professional periodicals have been numerous. In 1849 Robinson received the appointment of dentist to H. R. H., Prince Albert. His professional attainments also attracted the attention of the Baltimore College of Dental Surgeons which, in 1846, conferred upon him the honorary degree of Doctor of Dental Surgery. Mr. Robinson took an active part in the great dental reformatory movement begun in 1856, and was elected first president of the College of Dentists (London) in that year. In 1862 he founded the "National Dental Hospital," which was opened shortly before his death, which occurred in April, 1862.

We must not omit to mention here Robert Thomas Hulme, M. R. C. S., the author of "Teeth in Health and Disease," and several other works and translations. He wrote much for the English and Continental press, and was a member of a number of professional organizations, and at one time edited the *London Dental Review.*

He was born in London, January, 1816, and at an early period began the study of medicine at a London hospital, and commenced practice in 1840. As a man of science, his exertions were well known and appreciated when he occupied the position of lecturer on Comparative Anatomy at the Grosvenor Place School of Medicine. He greatly excelled as a lecturer, as his knowledge of every subject he handled was complete. In lecturing, he did not have recourse to notes, but spoke extemporaneously and with good effect. He was highly esteemed, by those who knew him, as an honorable and talented gentleman, and his death, which occurred on the 9th of July, 1870, is greatly regretted by them. He was, at the time, in the 54th year of his age.

The labors and literary productions of Benjamin W. Richardson have placed him upon a footing with the prominent practitioners and theorists of the present day. His lectures, originally delivered before the College of Dentists, in England, and afterward published in book form, have stamped him as a man of keen insight and practical ability.

Another practitioner worthy of mention was Edwin Sercombe, who was identified with the efforts to advance the specialty, which he practiced in London, and his name will always recur in connection with the Odontological Society and the London dental hospital. He was a man of great thoroughness and earnestness of purpose, and of unimpeachable rectitude. The profession everywhere deeply felt his loss. His death occurred April 14, 1875, in London.

James Harley, of London, was an exceedingly active member of the profession, who devoted himself with ardor to the educational interests of the specialty. He was one of the early members of the College of Dentists, of which he was for three years a member of council, and two years vice-president. He was born at Gibraltar, in 1797, and died at Finchley, August 22d, 1860.

We must not omit to mention the names of Cartwright, Waite, Mason, Salter, Coleman, Heath and Cole, all of whom have contributed extensively to the advancement of the specialty in Great Britain by their arduous efforts. Nor will we attempt to enter into details regarding the professional changes which have occurred in Great Britain, but will briefly allude to a few items of interest.

In the United Kingdom the advances in theory have been greater than in practical skill, while in this country the advances in all departments of the profession have been great. As a proof of this assertion, we may mention that it was some eighteen or twenty years after dental colleges were established in America before similar institutions were opened in London. It was in 1860 that the "Royal College of Surgeons of England" passed regulations relating to the professional education of candidates for examination in dental surgery. In instituting this department of surgery, the college laid down a curriculum to be followed by students and, after successful examination, granted a diploma of fitness to practice, under the title of "Licentiate in Dental Surgery."

In 1878 the "Dentists' Act" was passed, and came into operation the following year. In accordance with it each person styling himself a dentist, dental practitioner, or assuming any title implying a qualification to practice dental surgery, was compelled to enter his name in the Register of Dentists, and those failing to comply with this requirement were debarred from practice. By this Act the dentist is given the same protection and privileges as the medical practitioner.

The Royal College of Surgeons in Ireland also inaugurated, in 1878, examinations in dental surgery, and appointed examiners for existing practitioners resident in Great Britain, who are eligible according to certain conditions. The title of the new diploma is "Licentiate in Dental Surgery of the Royal College of Surgeons in Ireland."

On August 2, 1858, an Act to regulate the qualifications of practitioners in medicine and surgery was passed in England. From it we quote the following in consequence of its relation to the practice of dentistry:

"*Article XLVIII.* It shall, notwithstanding anything herein contained, be lawful for Her Majesty, by charter, to grant to the Royal College of Surgeons of England power to institute and hold examinations for the purpose of testing the fitness of persons to practice as dentists who may be desirous of being so examined, and to grant certificates of such fitness."

Recently a general law was established in Great Britain clearly defining the system of education necessary to be pursued by the student preparatory to his application for registration under the "Dentists' Act."

It must be admitted that dental organizations have contributed largely to the advancement of the specialty in Great Britain and elsewhere.

The "Odontological Society of Great Britain" was, we believe, the first organized in England, although there now exist six associations of a similar character, and it is impossible to estimate the amount of good which may attend the efforts of these organizations in the future.

The College of Dentists of England was founded in 1855, the Metropolitan School of Dental Science in 1859, and since that time the following institutions have come into existence: The Dental Hospital and School of Medicine, London; the National Dental Hospital and College, Edinburgh; Dental Hospital and School, Dental Hospital and Anderson's College, Glasgow; Dental Dispensary and School, Plymouth, and the Dental Hospital of Dublin. In 1858 the Royal College of Surgeons of England established a dental chair, and the Royal College of Surgeons of Ireland, and the Faculty of Physicians, Surgeons, of Glasgow, the Royal College of Surgeons of Edinburgh, and the Queen's College, Birmingham, now grant dental diplomas. The last dental hospital established in England was at Essex, in 1880.

The Birmingham Dental Dispensary was founded in 1855, since which time the following have opened their doors: The Reading Dental Dispensary, the Liverpool Dental Dispensary and Provident Dispensary, Eastburne.

The first dental appointment to the regular medical staff of Guy's Hospital was made in 1782, the appointee being a Mr. Rae. A dentist is now included among the medical attendants of most of the hospitals throughout the Kingdom.

In 1803 a dental appointment was made by the Middlesex Hospital, Westminster. Subsequently similar appointments were made to King's College Hospital, Charing Cross Hospital, the North London Hospital, the Royal Free Hospital. St. James Hospital, St. Mary's Hospital, St. Thomas Hospital, St. George's Hospital, St. Bartholomew's Hospital, St. John and Elizabeth Hospital, the Bethlein Hospital, All Saints Convalescent Hospital, the Bloomsbury Branch of the Metropolitan Medical Provident Association and the Oldham Infirmary.

There are published in Great Britain three dental journals.

There were, in 1881, about 6,000 dentists registered in Great Britain, a small number of this total being Americans.

With this imperfect review of the professional matters in Great Britain we will, in the succeeding chapters, consider the condition of the specialty in other parts of the world.

[To be continued.]

A REVIEW.

BY D. M. CLAPP, D. M. D., BOSTON, MASS.

[Read at the Nineteenth Annual Meeting of the Massachusetts Dental Society, in Boston, December, 1883.]

When one thinks he has found a new idea, and from his brain has sprung that which will cause his name to be placed among the few who have startled the world with something really new, he is very apt to find that his cherished dream was dreamed long before, and his idea new only to himself.

The dentist is perforce a practical man. Theories he likes, and, once or twice a year, perhaps, after his day's work is done, comfortably seated at his fireside, the dreamy mood comes over him. Visions float before him. His pet ideas march past in grand procession. The standard-bearers carry banners with head-lines in large letters, of the subjects, now vague and little understood, awaiting his strong and piercing thought to clear up and expound, so that the dullest may understand at a glance. He enjoys the dream, but one night cannot last forever; the next day's work effectually effaces the visions of the previous night, and it is long months ere the tired brain again indulges in resolves to make original researches into the realms of science so inviting to us.

I say the dentist is by force a practical man. I venture to say, with some few notable exceptions, that you cannot find a first-class dentist in full practice who is also a profound investigator into or a searcher after theories. Neither is the profound investigator a good practical dentist. The requirements of either are so great that the physical system is not able to sustain the work of both; hence, to be great in one, means less greatness in the other. There have been those who have tried both, but the fate of a Hitchcock, or others we might mention, soon overtakes them. The dentist's education is technical; it begins when he first decides to make the profession his, and ends when he lays down the instruments after the last operation is finished. Read, he must; think, he must; and *work* always.

I do not come before this Association with anything new to present, neither do I flatter myself that I can instruct its members, all of whom, for aught I know, are my superiors.

I have been led somewhat of late to go over in my own mind my personal experience since I began practice, and have found considerable profit in tracing various means and methods that I have used, abandoned, taken up again, perhaps in a modified form, and comparing what were formerly and are now considered essential qualities and results.

As I read, if any of you are helped, or are reminded of something important that has been forgotten, or inadvertently laid aside, and shall be taken up again on account of my words, I shall be more than satisfied, remembering that one who spent many years in arduous work for the elevation of our profession, but has now passed to the reward of his labors, said more than twenty years ago: "The educated practitioner, indeed, needs rather to be reminded than to be *taught.*"

Entering upon the study of dentistry about the time that cohesive gold came to the front, I was brought up to use it exclusively. In fact, I did not know how to make a wedge filling, and was entirely ignorant of the advantages of non-cohesive gold when used alone or in combination with cohesive. It is my belief that, under favorable circumstances, no more perfect filling can be made with any material than with cohesive gold. In fact, within a few days, I have seen some fillings made of cohesive gold, from bottom to top, that were put into dead, broken down teeth more than a decade ago, that are as perfect now as it is possible for a gold filling to be made. I am proud of these fillings. But one swallow does not make a summer, neither will these fillings, and dozens more like them, prove that cohesive gold is the best for preserving teeth as a general thing. Any man, who has had a few years of experience, that will at the present time say that cohesive gold has all the good qualities that gold possesses for filling teeth, or, on the other hand, that non-cohesive is the only thing to use, must be set down as a bigot, or ignorant, or something worse.

In making joints in large water mains, a hemp or some similar packing is first used, and then lead is hammered in to make it secure, hard and tight. So, in making secure fillings, we want to pack undercuts, except where great strength is required, and all places not easily accessible, with non-cohesive gold, and then drive it home with cohesive. But this is no new thing. I find written, dating back more than twenty years: "Since the introduction of crystal foil, we have almost invariably packed the walls of the cavity with soft foil, and filled the center with crystal. Perhaps this practice may be called eclectic, as we certainly believe soft foil is better for the walls of a cavity, while for solidity and fineness of finish, crystal foil is preferable." Have we improved upon this very much in the last twenty years?

Again, I read, published in January, 1867: "A *loose* pellet of *un*-adhesive gold, large enough to fill a cavity, will be found useful in many cases to be introduced *first*, into which small pieces of adhesive gold can be forced, to which others will adhere. This is especially useful in cases where you cannot fix an *adhesive* first pellet in the anchorage. Gold *mixed* in this way will be found *very* desirable by those who will try it in suitable cavities."

And again, in the same year, I find another saying: "He always commenced these (proximal fillings) by laying a cylinder of non-adhesive foil against the cervical wall, and then following down and finishing with adhesive foil, assisted by the mallet."

This tells about the whole story. Non-cohesive gold against the walls because, in ordinary cases, it can be made tight more easily than cohesive; then we need the cohesive for strength and fineness of finish. It is not necessary that enough non-cohesive foil be put in the cavity to line all the walls before using cohesive. In most cases, I think this is impracticable.

For many years I have been in the habit of starting fillings with non-cohesive foil, and, before consolidating it, forcing in the cohesive, and then working the two along together, using suitable-sized pieces of non-cohesive to be packed against the walls and in the less accessible places, and cohesive for the surface, where strength is needed.

A word in regard to the mallet: The introduction and general adoption of cohesive gold was soon followed by the mallet. The first year of my practice I used the hand-mallet exclusively, and some of the monuments erected at that time show conclusively that good fillings can be made with it. I abandoned it because of the difficulty in getting a good malleter. I have had, however, ever since, a strong affection for the old hand-mallet, and have again adopted it. But it was not to the hand or automatic mallet I wished to call your attention, but to the necessity, as I think, of giving gold a solidity in fillings, that cannot be had without it, unless great time is taken and very small pieces used. A filling by hand pressure, under ordinary circumstances, made as solid as it must be in order to get the best results, is far more exhausting to both operator and patient than if the mallet is used. I think there is such a thing as hammering the life out of gold, and that injudicious pounding is worse than none. I feel sure that in days past I have used the mallet to excess, and I know, beyond a doubt, that in days not many years back I have not used it so much as I ought.

You know the title of my paper is "A Review." It is a sort of personal retrospect in some respects. From my chair, where the mallet was used with what I considered commendable vigor, I came to have opportunities of overlooking other operators whose reputations were second to none in the world—reputations, I am bound to add, however, gained when they used the mallet as much as I was using it—who were putting in nice looking fillings with but few strokes of the mallet, and light, gingerly hand pressure. I thought a revelation had come to me, that I had been ignorantly subjecting my patients to unnecessarily severe treatment, that I had taken more time for operations than there had been any need of.

I tried the light pressure system; I made good looking fillings in from one-half to two-thirds the time as formerly. I thought I had struck the correct scheme. It took about two-thirds of a year to excite suspicion that fillings made in this way, although they would finish up well, and appear at the time to be perfect, were a little "off color,"—that there were flakes coming off, softening and disintegration at the margins of the fillings, and other things that made my heart feel as though it weighed about twenty-five pounds, and was made of cold lead. It took about three years to thoroughly convince that a gold filling, to show its best capacity for checking decay, must be put in *solid.* I would not be understood as saying that every part of a large filling must be as "solid as coin," but every margin and the entire surface must be very compact indeed.

As a filling material, I believe that gold at the present time must be reckoned high on the list. It must at all times be used with great care. Sometimes it is best alone, and sometimes in combination with other materials. It will not stand the test of indiscriminate use.

I cannot refrain from making a short quotation in this connection from one who has probably written more on dental subjects than any other living member of the profession. He is reported to have said, some seventeen years ago, in speaking of Morgan's plastic gold: "As to manipulating it, even a tyro would make a good filling in less time with it than the best operator could with foil. He would not say 'out loud' that an ordinary cavity could be properly filled with it in two minutes; but he would say, in a whisper, that it could be done in less time." It is hardly necessary to add that the gentleman thus speaking excluded gold entirely from his list of filling materials some years since.

Valuable as gold is for preserving the teeth from further decay, it is, however, far from being the ideal material for filling cavities of decay in teeth. Let us, who have for so many years done our best to save teeth with materials so unsuited for the purpose as those we are obliged to use, hope that before we lay down our work we may have the satisfaction of using a material that shall be exactly adapted to our requirements. There has been great advancement in dental materials and appliances during the last twenty years. In 1862, Dr. J. W. White made this remark: "The plugging forcep is the only *machinery* we know of that can be brought to bear in putting plugs in teeth." This was only about twenty years ago, and yet how many are there in this room who ever saw a "plugging forcep," or who do not now use machinery to a great extent in "putting plugs in teeth"? Surely, the last two decades have been fruitful in mechanical inventions. Let us hope that ere two more shall have passed, the *ideal* filling material shall be in our hands.

Soon after the advent of cohesive gold, the subject of contour fillings began to occupy a very prominent place in the discussions and writings of the times. I began by making mostly contour fillings. To-day I am a believer in a modified contour, that leaves as much as possible the margins of filling in a condition to be easily kept clean. The most of us, I presume, try to hold to a conservative course in our methods, and for our knowledge we are indebted to all writers and teachers. To Dr. Arthur we owe much (and I say it with all respect, for I believe him to have been entirely sincere and honest) for teaching us how *not* to separate the teeth. If all the mouths operated on by him are in the condition of those that have been under my observation, those who see them will never practice that system. We are also indebted to the gentleman who told us that a "good" gold filling could be put in in less than "two minntes" and other things. And so on, through the list.

In regard to contour or flat fillings, Dr. Latimer said, in 1867: "Until the advent of crystal gold, and the employment of the adhesive property of foil, nearly all plugs were left even with the walls—mere plain surfaces. This was necessitated by the difficulty—often quite insurmountable—met with in attempting to fill cavities compounded of more than one surface, and hence called compound cavities. Accordingly we got access to the approximal cavities of molars and bicuspids by slabbing off their approximo-grinding angles, and filled them with large soft pellets, cylinders or ropes. The aperture between the teeth was V-shaped, and, as a consequence, the patient subsequently experienced great annoyance from accumulations of food wedged between the teeth and *crowding* against the gum. Frequently the tooth-pick had to be employed several times during a dinner for the removal of such accumulations. . . . That occasional failures will be made by *any* process, I am fully aware; that imperfectly-anchored contour fillings will be liable to dislodgement, has been frequently proved to me; but an experience of more than five years of the contour work, following five years of the flat method, has compelled me to dissent from the judgment of those who style the modern method 'fancy' and 'filagree' work."

Dr. Latimer might also have said that decay often occurs around contour fillings, and something more than a perfect contour filling is usually called for.

In a paper of great practical value, read before this Society a few years ago, Dr. Bonwill, of Philadelphia, presented with great earnestness the necessity of so shaping the teeth before filling that, after the operation is completed, the margins of the cavities might be self-cleansing, or as much so as possible, and easily accessible to the brush. He insisted that for approximal cavities in bicuspids and molars there must be wide spaces at the necks of the teeth; that the walls should be cut well back and the filling built out so as to form the point of contact near the cutting edge. As a rule, this will leave the cervical portion of the filling just under the free margin of the gum, the buccal and palatine or lingual margins exposed to the action of the brush. This system requires a great amount of labor, but I am thoroughly convinced that in no other way can bicuspids and molars be so successfully filled. Simply removing the decay, and putting in a filling contoured to the original shape of the tooth, and then allowing the adjoining tooth to rest so against the filling as to cover its margins, will not as a rule be a successful operation. I must commend Dr. Bonwill's method.

To make lasting fillings in these cases nothing will answer but thorough, persistent hard work, backed up by good judgment and great skill. I have tried to show what treatment seems to me best for the bicuspids and molars, and have plead for contour fillings.

Passing now to the anterior six teeth, the conditions are changed. Contour work in large and medium cavities in these teeth is open to serious objections. The fillings will be very conspicuous, difficult to keep clean and, most likely, there will be a recurrence of decay. The proper way of treating these cases is, I conceive to be, to cut freely from the approximo palatine border of the cavity, making a wide opening underneath the teeth, *but without removing the point of contact near the cutting edge.* This can be done, as a rule, without injuring the shape of the teeth in the least, causing the filling to face toward the tongue, almost entirely hiding it underneath the tooth. Teeth treated in this manner, when looked at from the front, do not show that they have ever been filled, unless the cavities are very large, while a glance in the mirror, placed underneath, will reveal the entire circumference of the fillings in full view, and capable of being examined at any time without previous separation.

This system, as well as that advocated for bicuspids and molars, involves much hard and patient labor, and two or three fillings an hour cannot be made. But its advantages are so great that it seems as though it must be universally adopted. I do not remember, however, of a half dozen patients coming under my care, in as many years, that have had their incisors treated in this manner. It is no new thing, for it was advocated by the late Professor Chapin A. Harris, of Baltimore.

The best method to pursue is to separate sufficiently, by pressure, to get easy access to the parts, *without danger of cutting away the point of contact with the adjoining tooth—the saving of which is emphatically essential.* Some portions of the tooth may be removed with properly shaped chisels, but my main reliance is on the emery paper disks and strips. It is in just these cases that the emery paper disk is of the greatest service. The coarser grades cut very fast, and their flexibility makes it possible to so guide them as to give the tooth the shape required, and they are infinitely less disagreeable to the patient than the rigid corundum or diamond disk. I can't resist the temptation to say that, in my opinion, the emery paper disk of different grades and sizes is the most useful article that has been brought out since the advent of the engine. Strips of one-eighth of an inch, more or less, in width, cut from well-shellaced emery paper, are also exceedingly serviceable. The tooth having been properly shaped, and the cavity prepared, the putting in of the gold in these cases is one of the most comfortable and satisfactory operations we have to perform. The chair is low down, and the patient tipped back enough to be comfortable. Everything being in readiness, the operator seats himself, and begins the work. By aid of the mirror, the whole cavity is visible and easily accessible, and the whole operation is done in nearly an erect position. The gold all in, it is trimmed down with the coarser disks, and then those made from the flour of emery paper are used for the final finish. With these a polish is given to the filling and surrounding tooth substance that is simply a revelation to those who never used them.

Had I not already tired your patience too much, I would like to speak of various methods of separating, particularly the use of the ligature and cotton combined, and many other things that present themselves at this time. But I must leave this for others, or until some future time.

A RARE CASE IN DENTAL PRACTICE.

BY W. F. JOHNSON, D. D. S., EAST CORINTH, ME.

Mrs. M., a lady of fifty-two years of age, applied to the writer in March, 1881, concerning the condition of her mouth, giving the following history:

At the age of thirteen, when sick with fever, she was treated with calomel. Seventeen years after this treatment, the second superior bicuspid and first molar on the right side, together with the alveolar process attached, exfoliated, and came away in a body. Soon after, the corresponding teeth of the inferior jaw and the two central incisors, together with the alveolar process exfoliated and came away. After this, there was a continuous offensive discharge from the antrum and surrounding parts, until she came under my treatment at the above date, she having received no treatment whatever for the disease of the maxillæ up to that time. She had always been in poor health since her sickness with fever, referred to, about forty years before she came under my treatment. Her ill health she attributed solely to the diseased condition of her mouth.

The process of the superior maxilla was eaten away from the canine to the second molar, and extended to nearly the center of the hard palate, making an opening into the antrum and nasal cavities nearly an inch in diameter.

A large portion of the floor of the orbit was destroyed, exposing the eye, and causing intense pain in the eye whenever the patient went into cold air, also causing contraction of the inferior rectus muscle, the movements of which could be distinctly seen by the aid of a mirror.

Her remaining teeth being in bad condition, I removed them, seventeen in all, after which I commenced treatment of the disease of the maxillæ by applying aromatic sulphuric acid, about one-half official strength, direct to the parts affected, three times a week for two weeks. I then used dilute chloride of zinc twice a week for three weeks in the same manner. In the meantime I directed her to thoroughly cleanse the parts three times a day with tepid water, to which about 15 per cent. of phenol sodique had been added. This she did by taking it into the mouth and throwing it out through the nose. The discharge at this time having ceased, I discontinued all treatment except the use of dilute phenol sodique after the above manner, which she continued for about two months. At the end of that time the parts were all in a healthy condition. I then inserted a full set of teeth, after the usual manner, on rubber, which she wears constantly. All trouble in the eye ceased, the plate effectually shutting out all cold air. The treatment in this case was entirely local, no constitutional treatment whatever being employed.

I saw the lady a few days since and had the pleasure of finding her enjoying excellent health; and, although nearly three years have passed, there has been no return of the discharge, and the parts are to all appearances in a healthy condition.

TRUE DISINFECTANTS.

[From Scientific American.]

"Many a so-called disinfectant is employed to-day in a certain solution, when it does not possess any value whatever under the circumstances. If it is really our intention to disinfect we must be certain, at least, that we shall achieve our object with the remedy we are using; if such is not the case, we only irritate without benefiting. . . . Most surgeons have been satisfied to wash their hands and clean their instruments with a 2 per cent. solution of carbolic acid. Such a solution is almost inert, and a 5 per cent. solution is necessary to achieve the desired object. But what is the most interesting is the fact that *carbolic acid dissolved in oil or* WATER *proved itself* TOTALLY INERT! . . . . Koch found that carbolic acid dissolved in oil or in alcohol had not the *slightest* influence on the vitality of any of the micrococci or bacilli.

Sulphurous acid was found to be powerless against *spores;* bacilli and micrococci, when exposed to the fumes in a box, were killed in *twenty* minutes, but not at all influenced when exposed to the fumes in a room at the usual temperature.

Chloride of zinc proved just as harmless. A 5 per cent. solution exerted absolutely *no* influence on the spores of anthrax, notwithstanding the same had been exposed to the action of the remedy for a period of *thirty* days.

Of other drugs, the spores of bacilli were killed by chlorine water, fresh prepared; 2 per cent. bromine water, 1 per cent. aqueous solution of corrosive sublimate, 5 per cent. solution of permanganate of potassium, 1 per cent. osmic acid, within *one* day; formic acid, *four* days; ol. terebinth, *five* days; sol. of chloride of iron, *four* days; 1 per cent. arsenious acid, 1 per cent. quinine (water with muriatic acid), 2 per cent. muriatic acid, within *ten* days; ether, within *thirty* days. Inert, or nearly so, distilled water, alcohol, glycerine, oil, sulphur-carbon, chloroform, benzol, petroleum-ether, ammonia, concentrated solution of common salt, bromide and iodide of potassium, 1 per cent; sulphuric acid, sulphate of zinc and copper, alum, 1 per cent; permanganate of potash, chromic acid, the chromates and bichromates, chlorate of potash, 5 per cent; boracic acid, 5 per cent; acetic acid, 5 per cent; tannic acid, 5 per cent; benzoate of sodium, 5 per cent; quinine, 2 per cent (in water 40, alcohol 60), iodine (1 per cent. in alcohol), thymol (5 per cent. in alcohol), salicylic acid (5 per cent. in alcohol, 2 per cent. in oil).

As regards remedies which prevent the further development of spores, the following results were obtained. The first column of numbers means retarding development, the second, totally preventing it:

Corrosive sublimate, . .	1 : 1,600,000	1 : 320,000
Oil of mustard, . . .	1 : 330,000	1 : 33,000
Arsenite of potash, . .	1 : 100,000	1 : 10,000
Thymol, ...	1 : 80,000	
Ol. terebinth, . . .	1 : 75,000	
Hydrocyanic acid, . .	1 : 40,000	1 : 8,000
Ol. peppermint, . . .	1 : 33,000	
Chromic acid, . . .	1 : 10,000	1 : 5,000
Picric acid, ...	1 : 10,000	1 : 5,000
Iodine, ...	1 : 5,000	
Salicylic acid, . . .	1 : 3,300	1 : 1,500
Permanganate of potash, .	1 : 3,000	
Muriatic acid, . . .	1 : 2,500	1 : 1,700
Camphor, ...	1 : 2,500	
Eucalyptol, ...	1 : 2,500	
Benzoic acid, . . .	1 : 2,000	
Borax, ...	1 : 2,000	1 : 700
Carbolic acid, . . .	1 : 1,250	1 : 300

But as, for purposes of disinfection, the micro-organisms must be killed, and in the shortest possible period, and the effect of retarding the development of the spores (antiseptic) is not sufficient, only the following remedies can, according to Koch's experiments, be said to be of value: corrosive sublimate, chlorine, bromine, and iodine. Bromine in form of vapor is, as concerns rapidity of action, superior to chlorine and iodine."—*Med. and Surg. Rep.*

Dr. Arthur T. Cabot's results are as follows, viz:

"Carbolic acid, $\frac{1}{20}$—5 seconds.
Liquor sodæ chlo., $\frac{1}{10}$—15 to 30 seconds.
Salicylic acid, $\frac{1}{240}$—3 minutes.
Thymol, $\frac{1}{500}$—3 minutes.
Thymol, $\frac{1}{1000}$—4 minutes.
Carbolic acid, $\frac{1}{40}$—4 minutes.
Permanganate potassæ, $\frac{1}{60}$—over 6 minutes.
Chloride of zinc, $\frac{1}{12}$—over 6 minutes.
*Alum acetatis, over 6 minutes.

Dr. Henry O. Marcy, using Dr. Cabot's methods, arrives at results, as follows, viz:

Carbolic acid, $\frac{1}{20}$—5 seconds.
Carbolic acid, $\frac{1}{40}$—2 minutes.
Thymol, $\frac{1}{500}$—1 minute.
Thymol, $\frac{1}{1000}$—exposed 2 to 4 minutes, failed.
Salicylic acid, $\frac{1}{100}$—3 minutes.
Listerine—4 minutes.
Chloride of zinc, $\frac{1}{12}$—5 minutes.
Quiniæ sulphas, $\frac{1}{10}$—exposed 5 minutes, failed.
Boracic acid, $\frac{1}{10}$—exposed 5 minutes, failed.
Calcic chloride, $\frac{1}{10}$—exposed 5 minutes, failed.
Permang. potass., $\frac{1}{50}$—exposed 4 minutes, failed.
Boro-glyceride, $\frac{1}{30}$—exposed 3 minutes, failed.
Platt's chlorides—exposed 4 minutes, failed.
Ol. eucalyptus, $\frac{1}{100}$—exposed 3 minutes, failed."

Paper read before Am. Acad. of Med.

These statistics seem to bear me out in the assertion that the germicides are practically useless for use in cases of dental caries, owing to the necessary strength of the solutions and the length of time they must be used. *Corrosive sublimate* of a strength of 1 in

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*Recommended by Mr. Paul Burns in London Medical Record.

2,000 is the most active and certain, but who of us dares to use it as a mouth wash. Carbolic acid, the next most useful, of a strength of 1 in 20, would leave little living tissue on the surface of the oral cavity. All the others are entirely out of the question.

The question then recurs: What, as practical dentists, can we best use for those purposes for which our much lauded disinfectants fail us?

At the last meeting of the Merrimac Valley Society, and the first of the New England Association, this question came up and was debated at some length, and, if my memory serves me aright, Prof. Mayr made the statement, in reply to some remarks of mine, that, although these organisms required a very weak alkaline medium to live in, yet a very slightly stronger one was death to them. That is, the bicarbonate of soda solutions, which we can freely use in a saturated state, are practically the germicides the "bug" men are seeking, as well as the antacids of the acid men. *Quod erat demonstrandum.*

T. H. C.

TRANSLATIONS.

THE NATURAL SHEDDING OF THE MILK TEETH.

The loss of the milk teeth is a physiological process, whose intimate mechanism is still obscure. The few authors who have investigated the matter, since Hunter, have stated hypotheses which, in the present state of our knowledge, are inadmissible.

J. Tomes, himself, who, by his remarkable works on the development of the osseous and dental tissues, has gained an undoubted authority, explains it in a manner which we shall discuss presently, but which we feel compelled to reject although it rests upon certainly well observed facts. Finally, M. Magitot, whose labors on the anatomy and the histology of the teeth are so justly appreciated, confines himself in his most recent work to declaring the insufficiency of the divers theories heretofore put forth, without giving his own opinion. In his long article in the *Dictionnaire Encyclopedique*, he simply says "that the physiologic reason of the resorption of the roots of a temporary tooth is the existence beneath it of a corresponding permanent tooth."

This short article has for its end to make known the results of our own investigations upon this question, and to show that the resorption of the roots of the milk teeth, the sole cause of the loss of those organs, implies the intervention of no special organ, as most authors have wrongly asserted; but results simply from the physiologic modifications caused by the eruption of the permanent teeth on the nutrition of the surrounding parts.

The loss of the milk teeth is the condition necessary for the normal eruption of the teeth of replacement. It takes place successively for each tooth, or for each group of teeth, at a period very near that of the eruption of the corresponding permanent teeth, unless, which is a not unfrequent circumstance, some pathologic condition hastens it. It is a physiologic phenomenon which, under normal conditions, should take place spontaneously and entirely without surgical intervention. If, in fact, daily experience shows that this rule has numerous exceptions, it likewise shows that they are always connected with some trouble of the milk tooth, or with some anomaly. However this may be, the loss of the deciduous teeth is always preceded by a work of preparation whose seat is its roots, and which ends only with their complete disappearance. Then the organ, reduced to its crown and free from all connection below, detaches itself and falls with the slightest shock.

The resorption of the temporary teeth is an act which is accomplished slowly, and whose phases it is difficult to follow by means of specimens culled from subjects of different ages. At the moment when it is about to begin, the crown of the corresponding permanent tooth is finished and contained in an alveolus closed on every side and absolutely distinct from that of the deciduous tooth.

The first phenomenon produced is generally the disappearance by resorption of the thin wall that separates the two alveoli from each other; then resorption begins upon the root, generally, but not always at the points in direct apposition with the subjacent crown.

It takes place now on the end of the root and now on one of its sides. Sometimes, as we see in the molars, the opposite faces of each root, and sometimes two or three points of the same root simultaneously show the first traces of resorption. This, in all cases, attacks little by little the whole of the root and may even invade a portion of the crown.

The attacked parts are always easy of recognition from their peculiar appearance. They seem to have been gnawed; their edges are always irregular and sharp; their surface is composed of a multitude of minute excavations, visible under the magnifying glass or even with the naked eye. By what mechanism has this resorption been accomplished? In our opinion, it is by a process analogous to that of simple osteïtis, which acts constantly, as is well known, by alternative phenomena of resorption and osseous reproduction, with definitive predominance of either one or the other.

Histologic examination confirms this interpretation; it shows, in fact, as the investigations of J. Tomes have well established, that the resorption of the milk teeth is not a continuous phenomenon, but a process of irregular progress, presenting periods of arrest, and capable of being replaced by a work of development.

Under the influence of the physiologic irritation determined by the eruption of the permanent teeth, all around the point where the work is begun the united elements of the inter-alveolar wall of the cell containing the permanent follicle and of the periosteum of the deciduous tooth become the seat of an active proliferation, which results in the formation of a tissue resembling that of the embryonal marrow. This new tissue may in turn be the agent of destruction, or the agent of formation, according as this irritation is itself more or less intense. As in simple osteïtis, the same elements produce alternately the destruction or the formation of osseous tissue, according to the degree of inflammation.

The inter-alveolar wall is especially the seat of these alternations; constantly pressed upon by the erupting permanent tooth, it is destroyed in spots, to be again re-formed and again destroyed.

The roots of the temporary teeth show clearly the same variations, but in a less degree, and with a marked predominance of the destructive process. The cement is the first tissue attacked, then the dentine, finally the enamel, if the tooth is not lost before the resorption has reached this point. When the destruction upon a root is momentarily arrested, and has been supplanted by a movement of development, we find the excavated surfaces of the cement, of the dentine and of the enamel itself covered with a new formation which is moulded upon the irregularities of these tissues and intimately united to them. Tomes and Wedl, in their treatises, have figured preparations, showing these phenomena in a remarkable manner. This new tissue will in its turn undergo resorption, to again perhaps be re-formed until, finally, the destruction preponderating, the tooth finishes by falling out.

In no case does this reparative tissue present the structure of normal dentine, the development of this substance demanding special conditions not found in such cases.

In accordance with the facts just stated, it is seen that the resorption of the roots of the milk teeth is a phenomenon absolutely comparable with what is observed when, for example, an aneurism of the arch of the aorta, or any tumor of the mediastinum, eats away little by little, and at last perforates the sternum of the ribs. It is not the mechanical pressure of the tumor which thus causes the disappearance, molecule by molecule, of the bony tissue; but this pressure reaches the same result indirectly by the irritation it causes.

Just in the same manner does the permanent tooth act at the moment of its eruption, and as the irritation is not necessarily circumscribed to the exact points that receive the pressure, it is not seldom that temporary teeth are met with whose roots present traces of resorption at once on several points not in direct connection with the tooth of replacement, or indeed on points even separated from it by portions still intact of the inter-alveolar wall.

This mechanism of the physiologic loss of the milk teeth, so simple and so conformable to the ordinary laws of development, has never, we believe, heretofore received its correct interpretation. This phenomenon of the resorption of the roots has now long been regarded as a process complex and obscure; for even Hunter, declining to explain it by mechanical pressure alone, supposes, without definitely stating, the intervention "of some process peculiar to the economy."

Later, Lafargue, Bourdet and the elder Delabarre, described by the name "fungi-form body," or "absorbent papilla," a special organ situated beneath the temporary tooth whose office was to secrete a liquid able to dissolve the roots.

More recently J. Tomes, while rejecting this interpretation, reasserts the existence of the "organ of resorption," whose histologic structure he has even described with minute details. It is, according to him, a mass of cellules, many of which "resemble in an astonishing manner those which Kölliker has described under the name of myeloid cellules." It is sufficient to read Tomes' description to be satisfied that his "absorbent papilla" is nothing but this new formation of "embryonal marrow," whose development we have just explained; the histologic structure is identical, the function is the same. Why, then, make a special organ of these elements which are everywhere met with wherever a process of osseous formation and resorption is in action?—PROF. J. REDIER, in the *Lille Journal of Med. Science.*

NEW METHODS OF PRODUCING SURGICAL ANÆSTHESIA.

BY DR. WOLDEMAR HOLSTEIN OF BASLE, SWITZERLAND.

[Translated from the *Centralblatt fur Zahnheilhunde*, Nov., 1883.]

Ethyl Bromide as an Anæsthetic.—Among the new means of producing artificial anæsthesia, recently recommended, we must mention ethyl-bromide—first made use of by Dr. Lawrence Turnbull, of Philadelphia.

Turnbull has also given a new and improved method of producing this substance. It was formerly very imperfectly prepared from bromine and alcohol in the presence of some phosphorous. Turnbull made it out of potassium bromide or bromide of iron, with sulphuric acid and alcohol. He took 24 oz. of coarsely pulverized bromide of potassium, 64 oz. of sulphuric acid and 32 oz. of water; then, after thoroughly cooling, added to this mixture 16 oz. of alcohol of 95%, and heated the whole in a retort on the sand-bath to 93.3° centigrade. The following reaction takes place:

$$\underset{\substack{\text{Bromide of}\\\text{Potassium.}}}{KBr} + \underset{\substack{\text{Sulphuric}\\\text{Acid.}}}{H_2SO_4} + \underset{\text{Ethyl-Alcohol.}}{C_2H_6O} = \underset{\substack{\text{Acid Sulphate}\\\text{of Potassa.}}}{KHSO_4} + \underset{\text{Water.}}{H_2O} + \underset{\text{Ethyl-Bromide.}}{C_2H_5Br}$$

The ethyl-bromide vapors are caught by the distillation in water which floats above. After the development of gas has finished, about 20 oz. of ethyl-bromide are obtained. In order to have this product pure, it must be shaken with a solution of bi-carbonate of potash and then with water, and finally once more distilled.

There is a still better process of producing ethyl-bromide in large quantities: Mix in a stone jar 1 gallon of water and 2½ lbs. of iron filings with 5 lbs. of bromide while cooling carefully all the time. Filter the green solution of iron bromide carefully, add 15 lbs. of sulphuric acid and then mix with this solution 6 pints of alcohol of 95%; after this, distil the fluid. The product of reaction is:

$$\underset{\substack{\text{Bromide of}\\\text{Iron.}}}{FeBr_2} + \underset{\text{Ethyl-Alcohol.}}{2C_2H_6O} + \underset{\substack{\text{Sulphuric}\\\text{Acid.}}}{H_2SO_4} = \underset{\substack{\text{Sulphate of Pro-}\\\text{toxide of Iron.}}}{FeSO_4} + \underset{\text{Water.}}{2H_2O} + \underset{\text{Ethyl-Bromide.}}{2C_2H_5Br}$$

Seven pounds of ethyl-bromide are obtained for about twelve cents. This product, however, must again be distilled and cleansed at a temperature of 56° C. It will then lose its strong odor, and become pure and colorless. It boils at 45.4° C., and has a specific weight of 1.4. It is not combustible.*

Turnbull praised the ethyl-bromide very highly for its effect, as it disappears much quicker than chloroform and all other anæsthetics from the system. The heart and lungs are said to suffer but very little when not too great quantities are inhaled. Nausea is more seldom than when ether or chloroform are used. Finally, the anæsthetic effect of ethyl-bromide shows itself, especially *on the neck.*

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*See "American Journal of Pharmacy," Vol. X., No. 5, and "Pharmacist," Vol. XIII., No. 5.

Now it is a well-known fact that every newly discovered remedy or method finds enthusiastic advocates. But how often it appears that, notwithstanding this advocacy, it has no superiority over and sometimes stands far behind the old methods. It is certainly known that ethyl-bromide is an anæsthetic, and can be used as such; but the question is, will it be preferred to ether, chloroform or nitrous oxide? This question was treated a few weeks ago by the renowned surgeon, E. Rose.* After many clinical trials, Rose was convinced that ethyl-bromide would generally produce only semi-narcosis. To produce *entire* narcosis would take a very long time. (In one case of Rose's it took one hour.)

Lastly, ethyl-bromide has a very disagreeable quality; that is, a combination ensues in the system which discharges itself very slowly and imparts to the breath of the patient an intense and very repugnant odor. Therefore, the application of ethyl-bromide for cases of general surgery is discarded by Rose. Could not, however, ethyl-bromide be successfully used in dental practice where semi-narcosis is often sufficient? To investigate this point, is naturally a matter for practical dentists. For us, personally, remains the present conviction that true progress in artificial anæsthesia cannot be obtained by a continual search for new methods, but in the improvement in the application of chloroform and nitrous oxide, as shown by the experiments made by Paul Bert.

NON-CORROSIVE SOLDERING FLUID.

A non-corrosive soldering fluid is prepared in the following manner: Small pieces of zinc are immersed in muriatic acid to saturation, which can be known by cessation of ebullition; the zinc, also being added after this point, remains undissolved; add about one-third the volume of spirits of ammonia, and dilute with a like quantity of rain water. If the acid is gently heated at the time of adding the zinc, the dissolving will proceed more rapidly. This fluid causes no rust on iron or steel and is even excellent for tinning.—*Popular Science News.*

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*"Essays on Anæsthesia," Deutsche Zeitschrift fur chirurgie, Vol. XIX., No. 1, August 14, 1883.

EDITORIAL.

LISTERINE.

Listerine is the essential antiseptic constituent of thyme, eucalyptus, baptisia, gaultheria and mentha avensis in combination. Each fluid drachm also contains two grains of refined and purified benzo-boracic acid. The claim is made for it that it is a reliable antiseptic and non-toxic, therefore absolutely safe, even if used in full strength—internally or externally. Since the conviction has grown upon the profession that carbolic acid may be open to grave objections, the need has become seriously felt of a reliable antiseptic remedy that should be free from any toxic influence. Listerine is indorsed by a very large number of the best medical and scientific authorities as efficient and safe.

We have used it for nearly a year past, and freely say that we should very much dislike to be without it. It has a very agreeable odor, makes a pleasant and efficient mouth wash, is excellent for injecting pockets formed by pyorrhœa alveolaris, or infectious alveolitis, preferable in many cases to carbolic acid in the treatment of "dead" teeth and alveolar abscesses, inasmuch as it does not coagulate albumen, deodorizes the breath and imparts a cool and agreeable sensation to the mucous membrane of the mouth, and, in short, seems to satisfactorily meet the demand for a non-irritating and non-toxic antiseptic. For dental purposes it should, in our judgment, largely take the place of carbolic acid; it is certainly very much more agreeable to both patient and operator. We sincerely hope the profession generally will subject this preparation to a careful test.

S.

BE THOUGHTFUL OF YOUR PATIENTS.

When patients are confined to one position in long operations it will be noticed that they are inclined to place their hand to their back or side, thus showing that the position has become wearisome, and this notwithstanding you may have the easiest chair in existence. Just change the back of the chair or head-rest a trifle, bringing into use a different set of muscles, and then notice the instantaneous look of gratitude which follows. If you wish to please your patients and win a good class of practice, be mindful of these little acts which seem so small, but really have so weighty an influence.

"WANTED—A BAPTIST DENTIST,"

is the title, in bold-face type, of an advertisement in the *Canadian Register.* We are told that Dundas, with a population of four thousand, is without a dentist, that "a good brother would be very useful, and very soon prosperous." But would n't a Methodist dentist, a Presbyterian dentist, or a Unitarian dentist do quite as well? We did not know before that membership in the Baptist denomination was in itself a preparation for the practice of dentistry. But, since Swedenborg knew by the aching of his teeth that Paul had surrounded himself with hypocrites in the next life, the relation between theology and dentistry may be more intimate than we had surmised. If the people of Dundas have discovered that Baptist dentists have an inspiration and skill that is not possessed by those of other denominations, they are right in publishing the fact to the world. But we fear that we discern in this advertisement an attempt to revive, under the disguise of dentistry, the horrors of the inquisition for the purpose of religious propagandism.—*The Christian Register.*

Should any one of our good "Baptist dentists" secure this promising opening, we hope they will at once subscribe for the NEW ENGLAND JOURNAL OF DENTISTRY. We shall make no other charge for the advertisement.

THAT "PRIVATE" LETTER.

Prof. Wright has received a letter. He immediately announces the fact to the *Ohio State Journal.* It 's a pretty good letter, too. Here we have a portion of it.

"DEAR DR. WATT: I have just this morning received a letter from Berlin, from Miller, who says that he is more fully convinced than ever that 'the first stage of caries consists in a decalcification of the lime of the tooth by acids, *which for the greater part are produced in the mouth by fermentation.*'" (The Italics are ours.) "He believes, too, that he has at last got the *ferment* 'by the tail.' You know he has all along been misrepresented by many who have not studied his articles, and who simply think it 'the thing' to talk *germ theory* without study.

Miller's views will soon be published. He is a modest, hard-working young fellow, and is winning for himself and for American dentistry a fine name in Europe. Yours truly,

C. M. WRIGHT."

Possibly, when Prof. Wright has had time to reflect, he will see that if Dr. Miller has really "got this *ferment* by the tail," *it* must be a *micro-organism;* that if the "decalcification" is dependent upon an acid *produced by* micro-organisms, then the claim that they are "the essential factor in dental caries" is not so very "wide of the truth," after all. Certainly, even according to this view, no "bugs," no caries, and the "bugs" are "*primary.*" Will Prof. W. claim that this is a "misrepresentation?" Perhaps it may dawn upon him after awhile that he himself is the one who has "not studied" the articles of Dr. Miller and others with sufficient care.

The "difference in explanation," referred to editorially, relates to the precise point when dental caries *actually begins.* Miller claims that it begins with the *acid* stage of the process; the *germ theorists*, that it does not begin until the *putrefactive* stage is reached; that the result of the action of acids is erosive, simply, and stops short of true caries. In other words, if the *putrefactive* stage of the process in tooth destruction is altogether eliminated, there can be no *caries.* Teeth may be lost or destroyed from the results of the action of acids alone, but, in such cases, it should not be said that the loss or destruction is due to *caries.*

A HAIRY RACE.

In Burmah there was living a woman who had her body entirely covered with hair, and otherwise had a decided resemblance to the monkeys. King Thebaw, of Burmah, paid one of his subjects five hundred rupees a month to marry this peculiar individual; he wished to have the species propagated and, indeed, there was born alternately a normal and a hairy child.

There appears in our advertising pages an announcement of the dissolution of the firm of F. W. Leonard & Co., and the formation of the American Dental Manufacturing Co. We understand that Mr. Leonard continues the dental depot business at the old stand, but that Messrs. Hanway and Dawson have joined with others in the manufacture of dental supplies.

Has the pedal of your dental engine become smooth so that you are troubled by your foot slipping? Take a piece of common rubber packing, say one-eighth of an inch thick, cut out a piece of suitable shape and attach to the pedal with wire, and your annoyance in that direction, at least, will have an end. Even if your foot does not slip, the feeling of the rubber will be much more agreeable than the iron.

NOT DEAD BUT SLEEPING.

Not long since the funeral services of a wife and mother were in progress; the eulogy had been pronounced, songs had been sung, a prayer said, and the friends were about to take a parting look at the lifeless remains. The undertaker stepped to the coffin to see that all was in suitable readiness. He looks! he staggers back aghast. The parson raises his hands: "Friends, the funeral of Mrs. —— will proceed no further. She appears to be alive. You are dismissed."

The death of the *Missouri Dental Journal* has been heralded all over the land. The mournful announcement was official and regular. Eulogies have been pronounced, songs of praise and esteem have been sung, tears of regret have been shed and prayers for its repose and peace were uttered far and near. The would-be undertaker advances, but suddenly falls back. Signs of a struggle for life appear upon the countenance of the sleeper. The parson announces that the funeral will proceed no further. Strong men of science and skill are hastily summoned to the rescue and the indications are cheeringly hopeful that resuscitation will ensue. In fact, the patient has so far recovered from its trance-like state that a trip has been undertaken to the more congenial clime of St. Louis, its city of nativity, where the loving hands of friends and the cheering influences of home will, doubtless, make sure its complete *re-demise.*

We strongly suspect that Dr. Spalding could not consent to see his old friend buried out of sight, and we rejoice that it may now be said that the *Missouri Dental Journal* "is not dead, but sleepeth." It will soon appear again with all its old-time vigor, under the control of the dentists of the Mississippi valley.

Most heartily do we extend our congratulations.

* * *

At the meeting of the Odontological Society of New York, January 15, Dr. Perry presented some fine instruments made after his own patterns—excavators, scalers and plug trimmers—which he commended very highly for the quality of steel and temper; they were made by the successors of Blake & Co., Philadelphia.

Dr. Lord and others spoke in praise of Williams' "electric" gold.

Dr. E. T. Payne read an interesting paper on gutta-percha, giving some account of the history of its discovery and introduction to commerce. He said that no gum could be obtained now that was equal in quality to that which was first collected by cutting down the trees.

With a carefulness of which we have hardly an idea in this country, the statistics of diseases are collected in all the larger and smaller towns of Germany. Every week and every month the exact figures are published. This duty devolves upon the so-called state physicians who are nothing but city physicians paid a certain sum by the general government. Their duty, for which they receive this part of their income, is the granting of a certain time every day for gratis consultation, to give certificates of the deaths, births, autopsies, etc. The cause of the death has to be given every time. As an interesting example, we can give that in the month of May, in the kingdom of Bavaria, 2 per cent. of the children died of hooping-cough, of which there were twice as many girls as boys; on the other hand, children's cramps killed twice as many boys as girls—in all, 4 per cent. Tuberculosis caused death to the amount of 16 per cent., with almost twice as many men as women. Old age may be said somewhat absurdly to be more dangerous to women than to men, for almost twice as many women as men died of that desirable disease. Exactly one per cent. committed suicide—five times as many men as women. Deaths by accident and suicide have the same figure.

They treat offenses, for which the least punishment in this country is five years in jail, rather too lightly in Germany. A dentist took undue advantage of the narcosis produced by chloroform on a girl. She complained and, after much trouble, the case came to trial, and ended in a judgment of — six weeks in jail. This is slightly too cheap. They ought to have a little tar and feathers over there.

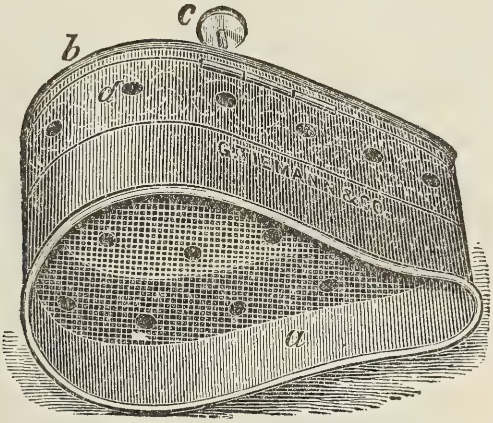
SELECTIONS.

A number of statistics are given about teeth in Russia, which go to show that there carious teeth are not quite so rare. They are not so common as here, since 60 per cent. of the soldiers show perfect teeth, but in this primitive country 40 per cent. have carious teeth. The third molar was in most cases defective. The duration of the upper teeth in proportion to the lower was about three to two. Individuals with light complexions had less durable teeth than those with dark ones, but the difference was only 3 per cent. The teeth of the right side show more vitality than those of the left, and the durability of the teeth was slightly in inverse proportion to the education of the individual. Among the students, Prof. Sklifassorvsky found that only 28 per cent. had perfect teeth; in 72 per cent. molars were carious. Eighty per cent. of the inhabitants of St. Petersburg have carious teeth; hence, civilization does not seem after all to have such a most prevalent effect upon the teeth.—*M. d. V. d. Z.*

AN IMPROVED INHALER.

BY R. W. MITCHELL, M. D., MEMPHIS, TENN.

The accompanying woodcut so clearly represents the instrument that an explanation of it is hardly necessary. This inhaler is made of tin. It is divided by a diaphragm of wire gauze into two nearly equal parts. The letter *a* shows the mouth-piece with the wire gauze inside, and openings for the admission of air. The cover *b*, opens by a hinge on the side, and allows the introduction of cotton cloth or other material, which lies on the top of the wire diaphragm, and receives the ether.



There is a sliding button, *c*, which goes between the fingers, and facilitates the handling of the instrument. When not in use, this button slides in.

This inhaler has been fully tested, and is recommended to the profession on the grounds of:

1. Durability. 2. Cleanliness. 3. Cheapness. 4. Economy of ether, the amount being far less than that consumed by other inhalers.

It is manufactured by Messrs. George Tiemann & Co., New York.

N. Y. Medical Journal.

ON THE RELATIONS BETWEEN DENTAL LESIONS AND DISEASES OF THE EYE.

BY HENRY POWER, M. B. LOND., F. R. C. S.,

Opthalmic Surgeon at St. Bartholomew's Hospital, and Surgeon to the Royal Westminster Opthalmic Hospital, &c.

[Read at a meeting of the Odontological Society of Great Britain, November 5th, 1883, and reprinted from the Transactions of the Society.]

The connection between dental disease and affections of the eye is not at first sight very apparent, but it has been noticed, though for the most part only casually, by many writers. I have thought that it might interest this Society, and might at the same time be serviceable to those who are engaged in opthalmic practice, if I attempted to collect some of the evidence which seems to demonstrate that dental disease may excite various opthalmic affections; that it might also be the means of eliciting valuable hints from those who are engaged in dental surgery, and that it might afford an opportunity for the citation of cases which, though exceedingly interesting when considered in connection with others of the same nature, may not have been regarded by those in whose experience they have occurred as of sufficient importance to merit reporting.

I have taken some trouble in looking through the treatises of those authors who have written in the course of the last hundred years, and I think it may be said that the connection between dental and opthalmic disease has not been specially dwelt upon in this country before the year 1824. Beer, indeed, before this spoke of a consensual affection of the eye which might occasionally be due to carious back teeth; but no mention is made of the teeth by Ware or Chandler, who both wrote in 1780, nor by Scarpa, whose treatise was translated by Briggs in 1806, nor by Weller in 1821. Scarpa, indeed, in his account of ptosis, states that it may be produced by indigestion and gastric disease, and by the presence of worms; and in speaking of amaurosis holds that it may result from contusion and laceration of the supra-orbital nerve.*

Weller (1821), in like manner, who copied the great German oculist Beer, though he does not allude to the teeth, and of course does not speak of reflex actions, yet recognizes this class of affections when he refers various forms of amaurosis to sudden suppression of lactation and acute cutaneous affections, and to loaded bowels, whilst he elsewhere refers strabismus and blepharospasm to worms in the intestinal canal. The first writers I have met with who distinctly refer to the teeth are Travers, who speaks of strabismus caused by difficult dentition, and Frick, who, in 1826, speaking of the causes of strabismus, remarks that it is "often concomitant with difficult dentition;" whilst Welbank, who translated Frick's book, in a note on the treatment of amaurosis, states that he has obtained good results from the employment of carbonate of iron in cases of amaurosis "proceeding from disease of the dental nerves."

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*Scarpa (page 511) gives many cases of reflex amaurosis.

After this period, difficult dentition and dental disease are often mentioned incidentally amongst other causes of opthalmic disease.

I presume that you will all accept as a fact, that which is admitted by all opthalmic surgeons, that there is such an affection as reflex or sympathetic opthalmia, that is to say, that irritation of one set of branches of the fifth will affect those of the opposite side; yet in discussing the subject before us it seems to me in the first place important that I should very briefly put before you the evidence showing that reflex irritation of the eye really occurs. If any opthalmic surgeon be asked why he believes in reflex irritation of the globe and its appendages, his mind at once reverts to many cases in which injury to one eye, especially of the ciliary region, has been followed, after a period of very variable duration, by inflammation of the uninjured eye of a low but steadily progressive type, generally involving all the tissues, and leading to more or less serious impairment, or even to complete loss, of vision.

I could give many cases from my own experience. I will limit myself to two.

A young man presented himself to me at St. Bartholomew's Hospital, Chatham, saying he had been struck with a piece of the head of a chisel on the eye. His vision had previously been perfect. On examination there was a wound in the cornea, a rent in the iris, blood in the anterior chamber, and traumatic cataract. He could see light, and the shadow of the hand. I had no doubt that a fragment of metal was in his eye, and that practically the eye was lost. I recommended its removal. He declined. A week after, perception of light still remaining, he again declined to have anything done. Soothing remedies were employed. About six weeks later he came with the opposite eye sharply inflamed; there was dimness of vision and general inflammation of the globe. He was now anxious to have the eye originally damaged, from which he had suffered a martyrdom, removed. I did that operation, but it was too late; the inflammation ran its course in spite of careful treatment, and he lost the sight of both eyes. That is the usual result.

[To be continued.]

A CURIOUS MALPOSITION OF A TOOTH.

In a recent number of the "*Lancet*," Dr. Gopaul Chunder Roy relates the case of a Hindoo lad, aged fourteen years, who presented himself for treatment at the Soree Charitable Dispensary, for what he considered to be a tumor growing within the nasal cavity. He noticed a foul smell in his breath about four months before, attended with catarrh and sometimes a bloody discharge from the left nostril. For the previous two months the growth had been observed to occupy the left cavity, where it seemed to be attached to its wall at its upper part, its free end was looking downward in the shape of a truncated cone. Arrangements having been made for plugging the posterior nares, in the event of uncontrollable hemorrhage, the tumor was seized with dressing forceps and extracted. It proved to be a tooth of the shape of a canine. There was very little bleeding after extraction, and this was stopped by alum lotion. The free extremity was covered by enamel, which stopped short at its junction with the root. The root was deeply embedded in the side and upper part of the antrum. The boy had got his set of permanent teeth, with the incisors and canines entire on either side. There was no deformity of the jaw and no swelling or cystic formation. It was clearly a case of extra-follicular development and eruption of a tooth in a wrong place, the peculiarity being that while in reported cases of like nature the crown of the tooth shows itself at the floor of the nasal cavity from below upward in the present instance, by some freak of nature, the dental follicle was transposed, and the eruption was from above downward. The tooth has been sent to the Royal College of Surgeons' Museum.

N. Y. Medical Journal.

BOOKS AND PAMPHLETS.

CENTRALBLATT FÜR ZAHNHEILKUNDE.

The chief editor of this paper lives in Geneva, Switzerland, and it is printed in Berlin, Germany—a slightly scattered affair about Cincinnati, Boston.

VICK'S FLORAL GUIDE, for 1884, is an elegant book of 150 pages, 3 colored plates of flowers and vegetables, and more than 1,000 illustrations of the choicest flowers, plants and vegetables, and directions for growing. It is handsome enough for the center table or a holiday present.

By sending your name and address, with *ten cents*, to James Vick, Rochester, N. Y., a copy may be received, postage paid. No lover of flowers should be without it.

Caulk's Dental Annual. L. D. Caulk, D. D. S., Camden, Del., editor and publisher. A dental hand-book of reference, 40 octavo pages, price 25 cents.

This is a neat little pamphlet containing many statistics of interest and importance: "a hand-book of reference" that every one will find convenient to have accessible. It also contains several excellent original articles by well-known men in the profession. Dr. Caulk would, evidently, make a good editor.

On the Relations Between Dental Lesions and Diseases of the Eye. By Henry Power, M. B. Lond., F. R. C. S. A reprint from the Transactions of the Odontological Society of Great Britain.

This is a paper that should be studied by every dentist. We consider it of so much importance that it may be looked for in some future number of this journal.

Dental Medicine. A Manual of Dental Materia Medica and Therapeutics, for Practitioners and Students, by Ferdinand J. S. Gorgas, A. M., M. D., D. D. S., of the University of Maryland, Baltimore. Published by P. Blakiston, Son & Co., 1012 Walnut St., Philadelphia.

This is a work of over 300 pages, printed and bound in a most excellent manner. As it comes just as we go to press, we cannot now attempt a review. A casual glance, however, convinces us that it is a work of great merit. We can do no better now than to quote in full the modest preface to the work, and reserve for a future number a more extended notice:

"This work has been prepared by the author in deference to many requests from former pupils, and has been compiled from lectures delivered by him in dental institutions during the past twenty-five years, and notes obtained from the standard works on Materia Medica and Therapeutics, and also from personal experience as a dental practitioner and teacher.

While the author claims the credit of the compilation, he does not claim originality in the sources, derivations, medical properties and action of the various articles of dental materia medica which are given in this work.

His intention has been to present not alone his own ideas as to the particular application of remedies, but also those of well-known and acknowledged authorities, and in such a manner as may be of service to the dental student in acquiring a knowledge of this important branch of his profession; hence nothing has been presented in this work that, in the author's opinion, is not applicable to dental practice, and that will not be of benefit to the dental student.

The dental formulary comprises many valuable combinations, and credit has been given, in every case where it was possible, to the authors of the different preparations.

The necessity for an American work of this kind has long been apparent, and after years of delay and promises the author gratefully dedicates this work to his former pupils in the dental institutions with which he has been and is now connected, in the capacity of a teacher."

January, 1884.

MONTHLY LIST OF PATENTS.

For Inventions relating to Dentistry and Surgery, bearing date Dec. 25, 1883. Reported expressly for this Journal by Louis Bagger & Co., Mechanical Experts and Solicitors of Patents, Washington, D. C.

290,915—J. O'Brien, Kalamazoo, Mich., artificial leg.

290,841—F. Bohsert, New York, N. Y., surgical chair.

290,359—R. M. Ross and E. J. Klinck, Utica, N. Y., dental engine fan.

290,401—W. P. Cooke, Milford, Mass., abrading disk-holding spindle for dental engine.

299,608—J. W. Snyder, Philadelphia, Pa., medicine inhaler.

10,423—R. M. Ross, Utica, N. Y., dental drill hand-piece.

290,014—B. F. Eshelman, Harlan, Iowa, dental plugger.

289,472—W. W. Vance, Kearney, Neb., device for holding dental drills on whetstones.

22,289,743—F. E. Young, Canton, Ohio, surgical chair.

THE

NEW ENGLAND

Journal of Dentistry.

Vol. III. MARCH, 1884. No. 3.

ORIGINAL COMMUNICATIONS.

THE BACTERIA.

CHARLES S. BOYNTON, M. D., BRANDON, VT.

[Presented to the Vermont Dental Society, at the annual meeting, 1883, and revised for publication by request of the Society, January, 1884.]

> "If we were to drop our acquired medical notions, and were to approach the study of disease from the standpoint of the modern naturalist, the germ theory would present itself in a more attractive light. Throughout nature every species of living beings struggles for its existence with all other beings with which it comes in immediate contact. In numerous instances this struggle amounts to the preying of a smaller species upon the body of larger creatures, the former deriving from the organism of their host their means of subsistence."
>
> *Prof. H. Gradle.*

For years bacteria have been known to exist, but not until the promulgation of the germ theory of disease have they awakened any particular interest in the popular mind. Up to this time they had been studied by but few scientists, consequently the popular idea of their place in nature has been exceedingly vague and indefinite, they being often looked upon as the embodiment of all that is evil, and as a result of this notion we find more false than true attributes laid to their charge.

In our description of their characteristics we shall make no claim to originality, our object being to give their life history as far as known to the present time; to explain natural facts in simple language, clearly defining the position they now occupy in the scientific world; and also to place before you, as clearly as we are able, the part they now (in the opinion of many of the dental profession) play in the production of dental caries. We have availed ourselves freely of what literature the subject affords, and in some places have found it impossible to give references, as much of the matter has now become the common property of those scientists who have given the subject the most attention.

At the present time some of the most difficult biological questions are those connected with the life history of these organisms; for while touching some of life's most diverse problems they offer without contradiction studies of the greatest interest. For, to study their history is, in truth, nothing less than to be brought face to face with the claims of spontaneous generation, with the chemistry of the fermentations, with the pathology and therapeutics of most of our virulent contagious diseases; and, notwithstanding the efforts of modern science to dispel the dark cloud which still surrounds the origin of life and its preservation, we must, if we would see any glimmerings of light, learn of these, the least of "life's children." However obscure the relations of these inferior organisms may be to the origin of life, their rôle in its continuance is better known. It is a well-known fact that the operation of nature's laboratory is suspended as soon as there is found to be a lack of material to work upon. Organic matter once produced cannot again enter into the current of life's processes until it has undergone new transformations—"produced according to some, favored by others; but, without contradiction accompanied by the development of bacteria; and without wishing to attribute to these organisms a finality which is repugnant to our monistic conception of the universe, it may be said that it is thanks to them that the continuation of life is possible on the surface of the globe." Those botanists who have recently given the subject the most study, agree in defining these organisms, situated as they are on the limit of the animal and vegetable kingdom, as "cells deprived of chlorophyll, of globular, oblong or cylindrical shape, sometimes sinuous and twisted, reproducing themselves by transverse fission, living isolated or in cellular families, and having affinities which approach them to the algæ and especially to the oscillatoriæ." "In addition to this enumeration, reproduction has been proved in bacillus by spores, and it is altogether probable that other species are reproduced in the same way." But this degree of precision in their history has been reached only through the most diverse vicissitudes, "At one time considered as animals, at another taken for vegetables; transported from the algæ to the fungi; and one author has even gone so far as to refuse them the nature of living beings." When we take into the account the minuteness of their dimensions and the difficulties with which their observation is surrounded, this diversity of opinion is not at all surprising.

"As early as 1675, while examining with his magnifying glasses a drop of putrid water, Leeuwenhock, the father of microscopy, remarked with profound astonishment that it contained a multitude of little globules which moved with agility. The following year he recognized the presence of bacteria in the feces and in tartar from the teeth," and, as we shall learn, if he has not named them, it is easy to assure one's self by the description which he has given of their form and movements that the organisms observed by him are truly *bacteria*, vibrios and perhaps leptothrix. For the first complete exposition and attempt at classification we are indebted to Devaine, who in the year 1868 published the results of his researches in the German Encyclopedia of Medical Sciences; in this classification he enumerates twenty-nine species.

From this date, 1868, the history of bacteria enters upon a new phase. Pasteur began his labors upon the fermentations and their connection with micro-organisms, while the labors of Devaine and Hallier upon the bacteria of Charbon and the micrococci of contagious maladies, called the attention of chemists and of pathologists to these organisms and especially to the bacteria. After Devaine, we find a memoir published by Hoffman in 1869, in which he demonstrates that they are plants having a distinct cellular structure; also that they can only be classed according to their form and size. He rejects the hypothesis of a spontaneous generation in their origin. Speaking of their rôle in the phenomena of the decomposition of organic bodies and in the fermentations, he says "that, with the exception of yeast, and of the acetic and butyric ferments, all the rest is still enveloped in obscurity."

M. Cohn is the naturalist who in our days has occupied himself the most with the bacteria. His first researches were published in 1853. Twenty years later he commenced the publication of a series of papers upon these organisms, and in 1876 he gave to the public two valuable essays. Up to this time there was nothing like uniformity in their classification and, in the presence of diverse opinions as to their nature and classification, all will acknowledge the truth of the observation of Cohn, when he says: "So long as the makers of microscopes do not place at our disposal much higher powers, we will find ourselves, in the domain of bacteria, in the situation of a traveler who wanders in an unknown country at the hour of twilight, at the moment when the light of day no longer suffices to enable him clearly to distinguish objects, and when he is conscious that, notwithstanding all his precautions, he is liable to lose his way."

The bacteria, as understood to-day by most botanists, consists of unicellular organisms, "the smallest representatives of animated nature commonly classed as the lowest form of fungi." The Germans call them "spaltpilze"—*dividing fungi*—on account of certain peculiarities in their mode of reproduction. When they develop in a liquid in a sufficient quantity they become visible to the naked eye, appearing either as a slight cloud, or gathered in little masses through the liquid, or forming a pellicle on its surface; but the fact of the absence of turbidity in a liquid does not exclude the possibility of their presence. In liquids more dense than water their presence can not be revealed by the naked eye. Sometimes the color some varieties impart to the liquid, although slight and only perceived when a considerable thickness of the liquid is examined, serves to indicate their presence and species. Upon examination of these clouds or accumulations, we find them made up of a multitude of little bodies in the form of minute granules and variously shaped rods, together with algæ and infusorial animals likely to be encountered as inhabitants of the same soil. "They severely tax the powers of the microscope for their sharp definition. The larger rods, when closely grouped, require a power of 100 to 200 diameters—while the finer granules require an amplification of 400 or more for their detection. Bacteria may be mounted for preservation on the usual thin cover glass used by microscopists, and the covers inverted and fastened to the ordinary microscopical slides. First smear the cover glass with the material containing the bacteria and, after drying a few minutes, immerse in strong alcohol to fix the specimen by coagulation of the imbedding substance. Then stain by immersing in common violet ink (aniline) at least five minutes. Wash in water and mount in a weak aqueous solution of carbolic acid."

The above is the process of Prof. T. J. Burrill, and we have found it the simplest and most satisfactory of any, though we have obtained very good results by mounting after staining in Canada balsam.

Bacteria vary in shape from spherical to oval, cylindrical and thread-like; and of the latter variety we find straight, or crooked, or spiral, flexible or rigid. We often find the spherical ones connected in bead-like strings or chains. The classifications most in use are based on the size and form of the organisms.

It is a matter of history that one discovery grows out of or follows another and cannot appear without its proper antecedent. Thus the microscope had to be invented and brought to a certain degree of perfection before any progress could be made in the study of these organisms. This will become more apparent to the reader when studied in connection with Prof. Burrill's remarks regarding the size of bacteria. "In transverse diameter one twenty-five thousandth of an inch is a very common measurement, while some, including spherical ones, are even less than half this size. Now, a dot one two hundredth of an inch across is barely visible to the eye of most persons, hence, a magnifying power of more than one hundred times across is required to barely see a common-sized *bacterium*. To make out its real shape and any details of structure, ten times the enlargement mentioned is necessary, and not unfrequently as much more as can be secured by the highest possible powers of the microscope. Increase the height of an ordinary man one thousand times, and his head would be more than a mile above the earth, yet under the same magnification one of these organisms would have plenty of room to swim freely, to stand on end and dance up and down in the film of water included between two pieces of flat glass pressed so closely together as to strongly adhere by capillary attraction. From one hundred to two hundred and fifty of them placed side by side would be required to stretch across the ordinary thickness of book paper. They are the smallest living organisms known to man, yet, as we shall see, by no means the least important in the economy of nature." Some naturalists have divided bacteria into groups upon their ability to move or not; but it is now well settled for the greater number that the same species may present itself sometimes in a state of movement, sometimes in a state of repose. The movements are of two kinds—a movement of the corpuscle upon itself, and a movement of translation. The first is sometimes nothing more than a molecular or *Brownien* movement which occurs in the smallest forms. But at other times it is more extended and consists in a movement of rotation round the axis, or a bending of the body. Prof. Cohn gives us the best description of these movements. After speaking of the two modes of life characterized by repose and by movement, he says: "In certain conditions they are excessively mobile, and when they swarm in a drop of water they present an attractive spectacle similar to that of a swarm of gnats or an ant-hill. They advance swimming, then retreat without turning about or even describing circular lines. At one time they advance with the rapidity of an arrow, at another they turn upon themselves like a top; sometimes they remain motionless for a long time and then dart off like a flash. The long rod bacteria twist their bodies in swimming, sometimes slowly, sometimes with address and agility, as if they tried to force for themselves a passage through obstacles, as the fish seeks its way through aquatic plants. They remain sometimes quiet, as if to repose an instant; suddenly the little rod commences to oscillate and then to swim briskly backwards, to again throw itself forward some instants after. All these movements are accompanied by a second movement analogous to that of a screw which moves in a nut. When the *vibrios* in shape of a gimlet turn rapidly round their axis they produce a singular illusion. One would believe that they twisted like an eel, although they are extremely rigid." The causes of these movements were explained at first in the supposed animal nature of the bacteria, and the movements assimulated consequently to voluntary movement; but this opinion can no longer be sustained, as similar movements are to be seen in a great number of vegetable organisms, such as diatoms, the oscillatoriæ, the spores of algæ and some fungi, etc. "No one, having seen these motions, can doubt the inherent power the little things possess, or can question their right to be classed as living objects; whether as animals or plants will depend on his previous information and experience, as well as upon what he sees. How they move, that is by what sort of organs or mechanism, is not easy to make out; but they have this power only when immersed in a fluid medium. When dry, they are motionless except as carried by external agents, as air currents."

"The simple structure of a *bacterium* is a minute cell with an outer cellular wall enclosing the protoplasmic contents. There are no organs or appendages, save in some, and perhaps all motile forms, there is at one, or at most, two points, an exceedingly fine, hair-like appendage, to the vibrations of which the movement of the organism is attributed. This fine *cilium* or *flagellum*, as it is called, is a difficult thing to see, even with the best microscopic equipment and most expert manipulation, partly on account of its exceeding fineness or thinness, partly from its rapid vibrations. Sometimes by introducing a weak solution of iodine, so as to gradually subdue the movement, the cilium can be made out when not practicable otherwise."

Bacteria increase by fission. There is nothing like sexual differentiation, nor is there in the development anything like the germination of a seed. Under proper conditions of nourishment and temperature, each rod or granule elongates and then divides into two. We often find the young organisms thus formed attached to each other partially or wholly, forming chains and threads. If the division occurs in more than one direction, groups are formed. The multiplication by *fission* continues until the soil is exhausted, or until the waste products of the bacterial tissue-change accumulate to a poisonous extent. Fission is not the only mode of reproduction. Propagation by spores can be observed in all the larger forms of bacilli. Continued vegetation without change of soil is usually terminated by the formation of spores, and these spores as a rule will not germinate in the unchanged soil where they were produced. The formation of spores is a criterion by which bacteria has been assigned to the vegetable kingdom. In animals, the appearance of germs is never coincident with the death of the parent, which mode of reproduction is quite common among plants."

As to their classification, Sachs seems to have solved the question by uniting the algæ and fungi in a single group, the *Thalophytes*, in which he establishes two parallel series, one comprising forms possessing chlorophyll, the other, forms destitute of it.

[To be continued.]

EARLY HISTORY OF THE MASSACHUSETTS DENTAL SOCIETY.

BY J. T. CODMAN, D. D. S., BOSTON, MASS.

[Address delivered before the Massachusetts Dental Society, at its Annual Meeting, in Boston, December, 1883.

The Massachusetts Dental Society, whose nineteenth annual meeting we hold to-day, was formed in the following simple manner:

In the month of February, 1864, two dentists accidentally met in the dental depot of S. S. White, and, while conversing on the subject of the want of union and brotherly feeling among dentists, and how they reviled one another when they should harmonize, help and sustain each other, one of them then said: Will you be one of six to form a dental society? On giving his assent, the other one called on Drs. Chandler, Ham, Harriman, W. W. Pray, E. N. Harris, and others, to the number of twelve, asking them to meet together. The result was a first meeting. The two dentists who met at the depot were Drs. D. G. Harrington and S. J. McDougall, Dr. S. J. McDougall taking special pains to interview the parties named, and others who are not now recalled.

The *first meeting* of dentists interested in forming a dental society in Boston was at the rooms of the Young Men's Christian Association, in the old Tremont Temple building, opposite the Tremont House. It was held in a moderate sized committee room off from the reading room, where the meetings were ofttimes o'ershadowed, shall I say disturbed, by the hymns of praise that reached our quarters from the adjoining room. It was called to order, and organized by the choice of Dr. Ira A. Salmon as chairman, and Dr. S. J. McDougall as secretary, and a committee was appointed to draft a constitution, consisting of Drs. I. A. Salmon, T. B. Hitchcock, S. F. Ham, G. B. Harriman and S. J. McDougall. Dr. Salmon was requested to act as chairman, and Dr. McDougall as secretary, until the annual meeting was had which was in contemplation. The date of this meeting was March 4, 1864.

Constitution-making was early begun—March 24, on which was the next meeting but one, the preamble and constitution were adopted. Drs. E. C. Rolfe, I. J. Wetherbee, E. N. Harris, S. J. McDougall, and G. B. Harriman were appointed an executive committee to act until the annual meeting. Eleven members signed the constitution, and paid the admission fee.

At the next meeting, seven new names were proposed, among them Dr. N. C. Keep, a prominent and conservative dentist of Boston, and the first discussion was had. It was on the subject of nitrous oxide gas, and is on the records as "interesting," and that is all that is said about it. The society then adjourned for one month.

At the next meeting, there were five new members proposed, Drs. Edwin S. Blake, Elisha G. Tucker, John T. Codman, of Boston, W. Irving Thayer of Chelsea, and A. Papineau of Waltham.

Drs. Thomas H. Chandler, Keep, and Wetherbee were appointed a committee on a seal.

The first annual meeting was held May 6, 1864. The Brothers Cook of Milford, H. F. Bishop of Worcester, and B. T. Currier of Boston, were admitted. The first board of officers was as follows:

N. C. Keep, President; I. J. Wetherbee, Vice President; T. H. Chandler, Recording Secretary; E. C. Rolfe, Corresponding Secretary; S. J. McDougall, Treasurer; E. H. Harris, Librarian; I. A. Salmon, S. A. Cook, B. S. Codman, H. F. Bishop, T. B. Hitchcock, Executive Committee.

Drs. Rolfe, Hitchcock, and Cook were appointed a committee to nominate an orator to deliver the annual address, and the choice fell on N. C. Keep, M. D.

At the next meeting, among the matters of business, it was

Voted, To send a copy of the constitution to every dentist in the State. The subject of plugging teeth was assigned, in July, for the next meeting, but instead a preamble and resolutions came up inciting the society to solicit the co-operation of all dental societies and individuals to test the validity of the Cummings patent, in such form and manner as the exigencies of the case demand.

At the next meeting, September 19, Dr. Ambrose Lawrence, of Lowell, proposed the establishing of a dental journal, and a committee was appointed on the subject. A committee was also appointed to give notice of intention to apply for an act of incorporation. Dr. Wetherbee proposed the establishing of a dental college under the auspices of the society.

At the October meeting, Drs. C. G. Davis, E. G. Leach, and J. H. Batchelder were elected to membership.

November 7, the committee on dental journal reported that in consequence of the disturbed state of the country, and the high price of materials and labor, it is inexpedient to act in the matter, and that the committee be discharged.

At the December meeting, our worthy friend, Dr. F. Searle, of Springfield, was elected, and a committee was appointed to report on a scale of fees.

At the January meeting, a committee of three was appointed to petition Congress not to extend the Goodyear patent.

At the February meeting, Dr. L. D. Shepard was elected to membership. It was also resolved that we consider the formation of the U. S. Dental Protective Union opportune, and do, as a society, consider it a privilege, as well as a duty, to aid said society by becoming members of it.

Thus far, the Massachusetts Dental Society went under the title of the Massachusetts Dental Association. In order to make its name conform with other similar organizations, by advice of the legislative committee who had the matter of its incorporation in charge, it was

Voted, To change the word Association to "Society," and it was incorporated under that name April 1, 1865.

At the second annual meeting but little change was made in its officers, Dr. Keep being re-elected president. Drs. Salmon, Cook, and B. S. Codman went out of the executive committee, and Drs. Lawrence, Ham, and J. T. Codman entered on its duties.

1865. Dr. Keep delivered the annual address, and Dr. Wetherbee was appointed the next orator. The first social meeting is here recorded. Dinner was had at the Tremont House, each member paying for his ticket $1.50. I find no note of the dinner, however, except that the report of the committee on collation was accepted. I find that the first written essay (excepting the annual address) was by Dr. Wetherbee, on Mallet Plugging; the next was by Dr. Ambrose Lawrence, subject not stated.

At the November meeting, on motion of Dr. Wetherbee,

Voted, That a committee of three be appointed to take under advisement the establishment of a chair of dentistry in the Massachusetts Medical College, in accordance with the recommendation of the President, in his annual address, and to take such action as the matter demands, and, by nomination at large, Drs. Keep, Wetherbee, and Chandler were appointed that committee. The society was now fully established, and the recording secretary evidently felt quite genial when he put on record that "the old subject of Mallet Filling again came up." A tooth was filled by hand-pressure, by Dr. Wetherbee, and tested with a mallet by Dr. Salmon. Afterwards, a piece of pure gold plate was tested, by mallet and hand-pressure, and shown to a committee to decide which holes were the deepest, who reported that "*some holes were deeper than others.*" Report accepted, and meeting adjourned. Dr. McQuillen, of Philadelphia, delivered a lecture on Audition and its connection with Dentistry, and Dr. Atkinson, of New York, paid us his first visit.

At the February meeting, the following essayists were appointed, and I am happy to say that they nearly all fulfilled their pledges; if not, some one took their places:

April. Dr. Keep: A New Method of Anæsthesia by Local Freezing.
May. Dr. Chandler.
June. Dr. Harris: Professional Fees.
July. Dr. Gerry.
Sept. Dr. Salmon: Conservative Dentistry.
Oct. Dr. Leach: Alveolar Abscess.
Nov. Dr. Goddard. (Dr. Harrington): Duties of the Dentist.
Dec. Dr. McDougall: The Dignity of the Profession.

At the March meeting, Dr. Moffatt was elected member.

1866. At the third annual meeting, Dr. Keep was re-elected president, Dr. Wetherbee delivering the annual address.

I pass hastily on. The American Dental Association had voted to hold its annual meeting in Boston. A subscription was started to entertain the members of it and $250 was raised on the spot.

At a special meeting, October 22, 1866, called by request of five members, the matter of a building for the society was started and it was

Voted, That the officers be directed to memorialize the Legislature for authority to hold property to the amount of $50,000.

The meeting of the American Dental Association in Boston was a great success. The report of the committee states that the amount subscribed and paid in was $1,160.30, and the amount paid out, $1,062.50, leaving in the hands of the treasurer, $97.80, which balance was paid in to the treasury of the Massachusetts Dental Society.

For nearly three years we were without a Code of Ethics. At the December meeting, it was

Voted, To adopt the Code as adopted by the American Dental Association.

At the January meeting, the subject of the essay and discussion was "Alleged Poisoning by Nitrous Oxide," which resulted in the appointing of a committee of five to investigate the whole subject—the secretary calls it "a committee of gas." Drs. Hitchcock, Keep, McDougall, J. T. Codman, and Salmon were that committee. Drs. Lawrence and Wetherbee presented the society with 500 copies of the Code of Ethics for general distribution, receiving a vote of thanks. At this meeting, it was

Resolved, That this society approve of the establishment of a New England Magazine, to be conducted by a board of editors, and that the New England dental societies be invited to unite in establishing such a publication by electing one of its members to the board of editors. A committee of five was also appointed to remonstrate against granting a charter to the Dental Vulcanizing Company, and again a list of essayists was made out for each month in the year.

1867.	March.	Dr. J. H. Batchelder, Salem.
	April.	A. S. Cook, Milford.
	May.	S. P. Miller, Worcester.
	June.	Dr. S. F. Ham, Boston.
	July.	C. F. Horne, Watertown.
	Sept.	W. W. Russell, Haverhill.
	Oct.	C. G. Davis, New Bedford.
	Nov.	Dr. G. T. Moffatt, Boston.
	Dec.	D. G. Harrington, South Boston.
1868.	Jan.	O. F. Harris, Worcester.

April 1, 1867. On the report of the committee on dental college being called for, Dr. Keep reported that the committee had attended to its duties; it had several meetings with the committee of the medical faculty, Drs. Bowdich, Bigelow, and Ellis, and that a plan had been decided on which had been unanimously adopted by the medical faculty. I now call the attention of our society to the following resolutions, which were introduced by Dr. Hitchcock and adopted at this same meeting.

Whereas, The Massachusetts Dental Society has adopted a Code of Ethics for the government of its members; and,

Whereas, It is essential that the provisions contained therein shall be conformed to by its members; therefore, be it

Resolved. First. It shall be the duty of members to report any violations of the Code of Ethics which may come to their knowledge to the executive committee.

Second. When the executive committee shall know of any violation of the Code it shall be their duty, and they are hereby instructed, to report such cases to the society.

Third. Should the executive committee report any member as having violated the Code, it shall be the duty of the secretary to immediately call his attention to it, with the request that it shall not be again violated.

Fourth. Should said member, after having his attention called to the offense, still continue to repeat the violation, he shall be proceeded against by the executive committee, as provided in the By-Laws, Article VI., Section 2.

The project of a building, with hall for the society in it, was still on the carpet. Dr. McDougall had introduced to the society a superior gold foil, manufactured under his own supervision, and had also announced to it that he would give all the profits of its manufacture for one year to the society towards the building fund. Circumstances did not favor the manufacture and sale of a large quantity of it, but at this meeting Dr. Leach made a report of profit on gold foil sold by Dr. McDougall of $102.70, which he very generously donated to the society. After this time, when the building project was given up, by his request it was transferred to the general fund. Dr. Hitchcock then moved a vote of thanks with an invitation to other foil-makers to do likewise. Dr. Atkinson, of New York, read a paper on Histology. A collection was then taken up for his benefit, which amounted to $18, for which he returned thanks.

1867. At the fourth annual meeting clinics were given by Drs. McDougall, Moffatt, Hitchcock, and J. T. Codman. This meeting was at the rooms of the Massachusetts Medical Society, in Temple Place, in the savings bank building, which thenceforth became the place of meeting. Dr. Keep declined a re-election, and Dr. Leach became president. Two vice-presidents were chosen, as by the amendment introduced, Dr. Bishop of Worcester, and Dr. Harris of Boston; Dr. J. T. Codman, secretary, and Dr. Chandler, orator. Progress was reported in the matter of the New England Magazine. The plan was adopted by the Connecticut State, Connecticut Valley, Maine State, Merrimack Valley, and our own society. Everything seemed favorable to an early issue, and it was voted to refer the publication of Dr. Bishop's address to the executive committee in expectation that it would appear in the new magazine. Dr. T. H. Chandler had been elected editor-in-chief. It was also requested that Dr. Chandler prepare a paper on the early history of this society.

. . . .

At the October meeting, Dr. Wetherbee stated that the hand could condense a filling equally well as the mallet. Dr. Leach took up the statement, and offered a challenge to him, which resulted in a trial before a committee appointed for that purpose. The result was that Dr. Wetherbee's hand filling weighed twenty-four grains, and Dr. Leach's twenty-eight grains, and was made with Dr. Salmon's automatic mallet. At this same meeting, $175 were appropriated out of the treasury for a microscope.

The society now inaugurated monthly social meetings at the houses of members. The first was held at Dr. Hitchcock's and the second at Dr. McDougall's.

I find that at the January meeting the new cabinet was announced as ready for contributions.

At the May meeting, various gentlemen gave their narrations of transplanted teeth. Dr. Coggswell led off, followed by Drs. Leach, Chandler, Keep, and Bishop, after which Dr. McDougall related a case where some teeth were displaced for considerable time, then replanted, and lasted fifty years, he having seen the patient with the teeth in, and he had knowledge of her truthfulness. It is related that "Dr. Waters told a larger story but did not show the patient!"

I now come to a pause in my sketch. You have seen that the men who were the life and soul of this young society were in dead earnest and that the society was full of life and activity, and full of projects of prime importance to the dental profession. A closer scrutiny of the records will show this fact to better advantage. It will show that the society had its list of subjects for discussion prepared in advance, and volunteers engaged, and as we look back we shall see what good it has accomplished. Out of chaos a great deal of order had come. The society had made a place for itself in the profession and in popular esteem. It had organized a dental college in our midst. It had obtained certain professional and legal rights, and was the owner of some working material. But a spirit of rivalry was growing up in its midst that did not provoke a closer union of its members, and a greater unity, but led the ambitious to seek to secure personal ends not always in harmony with its methods. Its period of change had now come. It was a State society, and called its members from long distances to Boston, to its meetings, but the personal squabbles of its Boston members induced its country members to forego its meetings.

Harris had withdrawn and was working up a new society with Wilson, Clough, and Tucker at its head. Wetherbee had struck a blow at the project of a dental college by going to the Legislature for the incorporation of a new society, and so it came to pass that the social meetings were first given up, then the monthly ones were changed to an annual and semi-annual meeting. The building project had come to naught, and the editor-in-chief of the New England Dental Magazine reported that "no material" for it had come to hand, and, consequently, the subject was dropped.

But these changes came gradually. In July, 1872, it was voted to give up the hall we occupied, and the monthly meetings were held at various dental offices of the members in Boston. In March, 1873, the society adjourned to the semi-annual meeting. It was held in Worcester. There the Connecticut Valley Association was in session, and a union meeting was held. Seventeen new members were added to the list of this society, and at its close the secretary was instructed to communicate to the Connecticut Valley Dental Association "our congratulations at the success of the union meeting, and the pleasure which this society has had in meeting with them."

The tenth annual meeting, 1873, was held in December, at the Meionean Hall, Tremont Temple. A recent death by chloroform gave the text and, with the exception of time taken for the annual address, the whole day was devoted to the discussion of the question of chloroform administration. After two sets of resolutions had been presented, the society finally passed the following:

Resolved, That in the opinion of the Massachusetts Dental Society, the use of chloroform in dental operations is not justifiable, and that the public should be advised to shun such practitioners as persist in using chloroform as an anæsthetic. Nineteen active members were admitted, and two corresponding members. Dr. Moffatt was elected president, succeeding Dr. Batchelder.

At the eleventh annual meeting, Dr. J. S. Hurlbut, of Springfield, was elected president, and the following preamble and resolution was passed:

Whereas, Certain persons in our profession persist in administering chloroform in dental operations, notwithstanding its well known dangerous tendency; therefore,

Resolved, That the members of the Massachusetts Dental Society do emphatically condemn the use of chloroform as an anæsthetic, and any member of this society who shall administer chloroform hereafter shall be liable to expulsion.

At the semi-annual meeting, which was held at Lawrence, resolutions were passed on the death of T. B. Hitchcock, M. D.

At the twelfth annual meeting, resolutions were passed on the death of Drs. Keep and Rolfe. Dr. J. T. Codman was elected president, and Dr. J. S. Hurlbut orator, who afterwards resigned, being away in Europe. Dr. R. R. Andrews was his substitute, and read his address before the society, in the rooms of the Christian Union, in Boylston street.

The twelfth semi-annual meeting was held in Salem, at the Essex Institute, June 7, 1877, and to my mind it marks an era in the history of our society. It was a well-conducted meeting. Dr. Batchelder, who was chairman of the executive committee, was ambitious to have a good meeting in the city where he was in practice. I had been elected to the executive committee, after a long absence, and used my endeavors to bring up the meetings, which had deteriorated in character and ability, to the former standard; to frown on the spirit of clique by giving work to the society in the reading and discussing of professional papers, by striving to add to the spirit of good fellowship already existing, and keeping in the background all personal jealousies and grievances. Seven good original essays were delivered, and when the meeting adjourned it gave a hope to all that better prospects and better times were in store for the old Massachusetts Dental Society. . . . .

The seed planted at this time bore good fruit. At the annual meeting, held at the Tremont House, by the exertions of the executive committee in securing good quarters and reliable essayists, the membership began to increase. It then numbered 58 members in good standing. At the next two meetings the number added was 39. A number of these were members who had left the society and returned to it. At this meeting, the society invited all the other societies to meet with them at the semi-annual meeting, in joint convention. A very successful meeting was the result, and comprised the New Hampshire Dental Society, Connecticut Dental Society, Maine Dental Society, Vermont Dental Society, Rhode Island Dental Society, Connecticut Valley Dental Society, American Academy of Dental Science, Merrimac Valley Dental Society, Boston Society of Dental Improvement, and the Harvard Odontological Society.

I now leave these records, remarking only that all of these societies, with two exceptions, were formed at a later date than the Massachusetts society. The temptation to continue these notes and extracts is great, but I forbear, as I wish to tabulate some of its proceedings, and as the later history of this society, which I was not asked to speak of, is pretty well known to you. The greatest important society lesson taught by its proceeding is that when its officers and members attend to its legitimate duties as a society devoted to dental science, and the education of its members, socially and professionally, it prospers; and when they stand on close ethics, and hold a tight rein over the private judgment of the duties of members as toward the profession, or when members have their private axes to grind, it loses its strength, its members give it the "cold shoulder," and its usefulness wanes.

It is hardly necessary that I should say that much good has been done by the formation of the Massachusetts Dental Society; that it was formed during the war, and that the many wise projects it inaugurated failed—some of them because of the unpropitious times, some because the projectors of them were too sanguine and had not wisely estimated their cost, and some because they had too much of personality mixed with them. It has been of very much use to the members of the dental profession in Massachusetts, and its influence has extended far beyond the borders of our ancient Commonwealth; but however much it has been of use to dentists it has been, as we know, of far greater use to the great community we dwell in. From its organization have sprung two schools of dentistry, not, however, bearing or professing any marked difference in styles of instruction. Whether or no it would have been wiser for this mother to have borne only one child, instead of two, it is not for me now to give an opinion. They survive—one bears the proud name of Harvard, and the other the name of my native city, Boston. My wish, your wish, all our wishes, should be that they shall devote all their energies to one common end: the elevation of professional standing of the coming generation of dentists.

WHAT IS THE TRUE HISTORY OF THE USE OF THE RUBBER DAM?

BY WM. T. La ROCHE, D. D. S.

This is a question that it is my intention to answer by giving the facts that are of my own personal knowledge and the testimony of those with whom my knowledge is connected—links in the chain. Right here it may be quite pertinently asked why I do this and at this time. My answer is this: In May, 1876, after a residence out of the city of over eleven years, during which time I had been able to attend I think but one dental meeting, I returned to New York. Some time thereafter I met my friend, Dr. J. W. Clowes, at a meeting held at a friend's residence and, among other things, the subject of a rubber dam was spoken of by us. I then remarked to him: "Doctor, I have read in the *Cosmos* that you stated at one of the meetings that you believed you were the first to use the rubber dam in this city; now, you are mistaken in that. I believe I was the first to use the rubber dam." The conversation was brief and, after it was over, I gave the matter no further thought at the time. I certainly did not imagine for one instant that this little passing conversation would create the discussion and tend to cause the contention in the profession that it apparently has. Nothing could possibly have been more foreign to my intention.

Dr. Clowes, no doubt assuming that I must possess evidence to support my claim, and information relating thereto that might be interesting, wrote to me in December, 1877, kindly inviting me to meet several professional brethren at his house and to give them such information as I possessed concerning this matter. At a meeting subsequently held, as a result of this invitation, after the subject had been brought up by him, upon his request for a statement from me, I complied, by stating in substance that I firmly and conscientiously believed that I was the first to invent, introduce and use the rubber dam as applied in dentistry; that while upon so short and unexpected notice I was not prepared to adduce competent and satisfactory evidence thereof, yet, nevertheless, I felt very certain that, within a reasonable time, I could produce such evidence and fully prove my assertion to be true. Since then, as many of you are doubtless aware, this question has been brought up at various times and places, and still continues to arise. It must be settled. Let the whole truth of this matter be known, and *now*. If I could, I would always avoid doing any act or saying anything that might provoke a discussion involving delicate questions of this character, or that could evoke any unfriendly feeling or spirit. Rather than do so, though again and again urged to speak, I have remained patiently silent and would still continue silent, but this matter has now assumed such proportions and portent that, knowing I am right, with the truth on my side, I cannot and will not stand in a false light before the profession any longer. A due respect for myself and my word demands this. Justice is all I seek; honors I ask of none. All I ask is to fully and fairly state my case to you upon its own merits. If my claim is a mistaken one, if the credit justly belongs to another, then no one will be more willing to do him honor than I.

When I came to New York, in 1849, and before commencing the study of dentistry I was, during part of that year and for the three next succeeding years, in the employ of Messrs. Van Duzen, Jagger & Co., a firm then doing a large dry-goods business in this city. Some two years of the time I was thus employed I spent my evenings in the office of a dentist, studying and working at mechanical dentistry, during which time I frequently made a set of teeth for and sold a bill of goods to the same man. In April, 1852, I left their employ and commenced the practice of dentistry. In the store of this firm the Goodyear Rubber Glove Company had an office. Naturally, I became acquainted with the representatives of this company, and also quite familiar with the rubber material manufactured and used by them. This association was the germ of my use of the rubber dam; it was from this company that I subsequently obtained the first rubber to use for a dam. The exact day and month when I first used a rubber dam I cannot now state, but I do know it was used by me in 1857; to that fact I am ready to make an affidavit at any time. Now for my proof: It consists of the following affidavits from patients and former students of mine. You will observe that most of these deponents live right here in this city. I think most any unprejudiced man must admit that there is sufficient evidence here submitted to absolutely justify and vindicate me and to prove with reasonable certainty that my assertion that I first invented, introduced and used the rubber dam, had for its foundation the truth.

City and County of New York, ss.

William A. Skidmore, being duly sworn, says that in the month of December, 1857, William T. La Roche filled certain teeth for deponent; that at that time the said William T. La Roche made use of a piece of thin rubber cloth with a very small opening cut therein through which the tooth to be filled was pushed for the purpose of keeping the cavity in such tooth dry while being filled. Deponent further says that he knows that in 1850 said William T. La Roche was employed by Van Duzen, Jagger & Co., and that a rubber glove company then had an office in the store of the aforesaid firm in the city of New York.

WILLIAM A. SKIDMORE.

Sworn to before me this 14th day of March, 1883.

JOSHUA KANTROWITZ, Com. of Deeds, N. Y. Co.

STATE OF NEW YORK, *City and County of New York, ss.*

George B. Haines, being duly sworn, deposes and says that he resides in the city of New York; that in the month of March, in the year 1857, Wm. T. La Roche filled a certain tooth for this deponent; that deponent knows that at said time William T. La Roche used a piece of thin rubber material or cloth for the purpose of keeping the cavity in said tooth dry during the operation of filling the same by cutting a hole in the said rubber material or cloth and forcing the tooth about to be filled through the hole so made.

GEO. B. HAINES, 215 West 53d street.

Sworn to before me this 27th day of April, 1883.

R. P. H. ABILL, 16, Notary Public, N. Y. Co.

STATE OF NEW YORK, *City and County of New York, ss.*

Francis F. Reynolds, being duly sworn, deposes and says that he resides in the city of New York; that in 1857 and 1858 deponent was a student in the office of William T. La Roche, at 191 Bleecker street, in said city; that at and during said time, namely 1857 and 1858, deponent knows that said William T. La Roche did use a rubber cloth or dam for the purpose of keeping certain cavities in teeth dry during the operation of filling them; that the manner of using said rubber dam was as follows: A small hole was cut in a piece of thin rubber cloth, the tooth about to be filled was forced through the aperture so made, and the tooth thus kept from contact with any wet surfaces; that deponent frequently saw said William T. La Roche use rubber cloth in such manner for such purposes. Deponent further says that at the above time mentioned William C. Tinker was also a student in said office.

FRANCIS F. REYNOLDS.

Sworn to before me this 26th day of February, 1883.

GEO. R. WESTERFIELD, Notary Public, N. Y. Co.

STATE OF NEW YORK, *City and County of New York, ss.*

Elizabeth A. Yale, being duly sworn, deposes and says that she resides in the city of New York; that in the month of September, in the year 1859, William T. La Roche, dentist, No. 191 Bleecker street, filled a certain tooth for deponent; that deponent knows that at said time said William T. La Roche used a piece of thin rubber material or cloth for the purpose of keeping the cavity in said tooth dry during the operation of filling the same by cutting a hole in the said rubber material or cloth and forcing the tooth about to be filled through the hole so made.

ELIZABETH A. YALE, 248 West 53d street.

Sworn to before me this 27th day of April, 1883.

R. P. H. ABILL, 16, Notary Public, N. Y. Co.

STATE OF NEW YORK, *City and County of New York, ss.*

Richard Morary, being duly sworn, deposes and says that he resides in the city of Havana, Cuba, and is a practicing dentist; that in and during the years 1859 and 1860 deponent was a student in the office of William T. La Roche, in the city of New York; that at and during said time, to wit, 1859 and 1860, deponent frequently saw said William T. La Roche use a rubber cloth or dam for the purpose of keeping certain cavities in teeth dry during the operation of filling them; that said William T. La Roche did at that time, to wit, 1859 and 1860, instruct deponent in the use and proper application of the said rubber dam. Deponent further says that the use of the rubber dam as then and at that time made by said William T. La Roche was and is practically and substantially the same as is now in general use in the dental profession.

RICHARD MORARY.

Sworn to before me this 8th day of October, 1883.

GEO. R. WESTERFIELD, Notary Public, N. Y. Co.

City and County of New York, ss.

Helen F. Biddle, being duly sworn, says that she resides in the city of New York; that in the month of December, 1862, at No. 191 Bleecker street, in said city, William T. La Roche filled certain teeth for deponent; that deponent knows that at said time, for the purpose of keeping certain cavities in deponent's teeth dry during the operation of filling them, said William T. La Roche used a kind of rubber cloth through a hole in which he pushed the tooth having such cavity. Deponent further says that she still retains the teeth so filled as aforesaid.

HELEN F. BIDDLE, 35 West 55th street.

Sworn to before me this 27th day of April, 1883.

R. P. H. Abill, 16, Notary Public, N. Y. Co.

State of New York, *City and County of New York, ss.*

James M. Gano, being duly sworn, deposes and says that he resides in the city of New York and is a practicing dentist; that in and during the years 1863 and 1864 he was a student in the office of William T. La Roche, in the aforesaid city; that at and during the said time, to wit, 1863 and 1864, this deponent did frequently see and witness the said William T. La Roche make use of rubber cloth or dam for the purpose of keeping certain cavities in teeth dry during the operation of filling the same; that said William T. La Roche did, at the aforesaid time, instruct deponent in the proper method of application and use of the rubber dam as aforesaid. Deponent further says that the use of the rubber dam as then and at that time made by the said William T. La Roche was and is practically and substantially the same as is now in general use in the profession.

JAS. M. GANO.

Sworn to before me this 11th day of October, 1883.

Benjamin A. Moran, Notary Public, N. Y. Co., No. 176.

State of New York, *City and County of New York, ss.*

Oren D. Pomeroy, being duly sworn, deposes and says that he resides in the city of New York and is an oculist; that from September, 1864, until April, 1865, inclusive, deponent attended William T. La Roche professionally; that at and during all of said time said William T. La Roche was suffering with opthalmia; that deponent knows that William T. La Roche at said time was, by reason of his said disease, totally unable to use his eyes for the purpose of reading.

OREN D. POMEROY, M. D.

Sworn to before me this 12th day of October, 1883.

Arthur Fitch, Notary Public, 69, New York Co.

CLEANLINESS.

BY HYMAN ROSA, M. D. S., KINGSTON, N. Y.

If the old adage be true that "Cleanliness is next to godliness," it is equally true that many dentists of the present day are very far away from godliness.

While it is not to be supposed that many gentlemen before me require a lecture upon refined manners and tidy habits, yet it is painfully true that many of our profession need just this very lecture upon a principle which is among the most important, if not *the most radical one of our calling*, and to which they would appear to be almost total strangers.

If the dentist does not possess sufficient means to furnish his office elegantly, he can certainly give it an air of cleanliness, and there is little excuse for allowing unsightly objects to confront and impress our patients at first sight with feelings of disgust. That this matter is not sufficiently considered by a large number of our brethren, proofs are very abundant.

There is no excuse for furniture covered with dust; carpets littered and unswept, or spittoons bespattered and unsightly with blood from a previous victim. There is no good reason why a dentist should not have a bountiful supply of clean napkins, towels and rubber dam. There is no good excuse for a dentist not thoroughly cleaning his forceps, his excavators, or his scalers and separating files. There is nothing to prevent a dentist from washing his hands and cleaning his nails before putting them in a patient's mouth. In fact, there is no reason why a dentist should not be as near perfection, in these preliminaries, as possible.

We are, to a great degree, *the educators* of our patients. If our habits are loose, our personal appearance untidy, and our operating room in a shabby and dirty state, we cannot complain if our patients are careless in their treatment of our place and its appurtenances; if our hands and face and mouth are unclean, we dare not chide them for duty neglected and unperformed. Then, also, if a dentist is particular in keeping his office and its appurtenances neat and orderly, we feel he will be particular in having his operations thoroughly performed, and such an one will be most likely to gain confidence and esteem, even among entire strangers. In personal appearance, it is not necessary that a professional man should dress like a fop; but clean linen and suitable attention to the toilet add much to personal charms.

Our patients are usually more observing than we suppose, and sometimes notice things that reflect unfavorably upon us; hence, we need be ever on the alert, and see that our manners, our apparel and our office appointments are such as will bear scrutiny or defy criticism.

It was my privilege to visit the New York College of Dentistry, a short time since, and though I say it somewhat reluctantly, it is no less true, that it was about the dirtiest place and the most slovenly lot of persons I could conceive to be engaged in teaching the principles of dentistry, much less *its practice*. The demonstrators of operative dentistry were not bad-looking individuals, but their personal appearance was decidedly against them, in my estimation. Greasy, shiny coats; linen spotted and soiled, hands grimy, and "nails with dirt enough under them in which to plant potatoes," as we used to say when we were boys. Of course, the students, with such examples daily in their midst, were largely on the same plane with the demonstrators, and is it at all strange that, being with them from day to day in association, they should experience—perhaps unconsciously—an assimilation?*

Lastly, dentists should be clean and neat for *sanitary reasons*. Many diseases can be conveyed through the agency of instruments or appliances infected therewith. Instruments used in the mouth should always be washed thoroughly, and if any doubt exists in the mind of the operator concerning the presence of any contagious malady, the instruments should be disinfected by dipping them in a mild solution of carbolic acid and water.

Brethren, facts, like mules, are ofttimes stubborn things; but it becomes us, as professional men, as professional artists, and as professional teachers, to see to it that these important points be not slighted or overlooked. There is no need of mincing matters, and calling slovenliness *a manifestation of genius*, or dirt and disorder *the evidence of a good practice*. Carelessness and filthiness need no second invitation in a busy dentist's office—*we know* something about that. They are, therefore, no good evidence of professional fitness but, as I have attempted to prove, are often the standard by which the proficiency of a dentist is judged. Let us, then, carefully guard this avenue of our reputation, and by precept and example be diligent advocates and supporters of the habit of cleanliness.

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*We are sorry to have heard precisely the same statements from others who have visited the above-named college. It is a blemish undoubtedly too common with all our colleges, but one that should be removed. Students cannot be too sharply or too persistently made to feel the importance of *absolute cleanliness* of person, office, and all instruments in daily use; and if the colleges *practically* educate (?) them in the opposite direction, it is nothing less than a gross wrong, to students at least.—*Ed.*

EDITORIAL.

ANOTHER WORD ABOUT ANTISEPTICS.

Dr. R. F. Weir, speaking before the New York Academy of Medicine, on this subject, said: "Since the researches of Koch, Kümmel, and others, we now have very clear ideas on the subject (the use of corrosive sublimate as an antiseptic). It had seemed to him the acme of an antiseptic for surgical purposes, efficient, safe, cheap; but, during the last few days, he had discovered that it was not entirely free from objection, since its solution was not durable. In the course of one or two weeks it became changed to calomel, as he had found by testing surgical dressings saturated with it with lime water. A few days since he had written to Professor Gibbs, of Harvard University, in regard to the matter, and had just received a reply, in which he said he thought the solution of bichloride might be made durable by the addition of a small quantity of common salt, say five parts in a thousand. He proposed, however, to make further investigation on the subject. . . . . . . The solution employed was bichloride of mercury 20 parts; water, 44,480 parts; glycerine, 500 parts. It was sometimes used as strong as one to 1,000. The glycerine is added to prevent the gauze from entirely drying, as it becomes a little weakened when entirely dry."

This is speaking, of course, of surgical dressings, and has no reference directly to its use in the mouth. It is interesting, however, to the dentist, as showing the direction of the latest thought on the "bug" question. I have seen it stated, but cannot now lay my hand on the passage, that an eminent surgeon in a European hospital is using the bichloride freely, in a one part to two thousand solution, for vaginal injections and similar purposes. If it can be used in such cases without fear of absorption by the very susceptible mucous membrane of these parts, I see no reason why it may not also be used freely about the mouth, avoiding swallowing it, for all the antiseptic uses of the dentist. I have used it thus to some slight extent in the so-called Rigg's disease, and similar cases, but have not noticed any marked effect, perhaps because I have not been heroic enough. I have no doubt that others have been experimenting in this direction, and I would like to hear from them; every word is now important. The point of the change of the solution into calomel is an important one, and may account for many failures. T. H. C.

HINTS TO WRITERS.

Dr. Billings, U. S. A., and librarian of the Surgeon General's office, gives the following hints to those who write for periodicals:

1. Have something to say.
2. Say it.
3. Stop as soon as you have said it.
4. Give the proper title to your paper.

While all the above are of equal value, we desire to call the particular attention of dental writers to that one which says:

"*Give the proper title to your paper*," or, in other words, let the title as nearly as possible show what the article treats of.

If you ever have occasion to make an index to dental journals, as we are now doing, you will realize the importance of this seemingly trivial hint; and if you often consult the indexes of our dental magazines, you will as often be tempted, like the Dutchman's son, "*to think dam*," even though you do not actually utter it about those who, when they report an interesting case of "Necrosis of the Superior Maxilla," give it some such title as a "Case in Practice," as the man who calls his paper "A Rare Case," when, if he had given its proper title of "Alveolar Abscess Involving the Antrum," you could at once tell whether it was what you were looking for or not. Then there is the case of the man who gives his title as "Interesting," when his paper concerns "Dental Statistics in Russia."

Prof. Otis S. Robinson, of the University of Rochester, says, in an article by him on indexing periodical literature: "Think of a valuable historical article on steam navigation, written for one of the British quarterlies at the time the Great Eastern was launched, as indexed under its fancy title: Triton (The) and the Minnows; or, of a long article in the *North American Review*, at the close of the war, reviewing the Rebellion record, as indexed: Scotch the Snake or Kill it; or, Snake, Scotch or Kill it. Some writers have a fancy for such taking titles, and the indexer must be able to reject them promptly, and substitute whatever his own judgment dictates."

Such a title as "A Review," will do well enough when reading a paper before some society, as it rather excites the curiosity of those present as to what is coming; but, when it is published, let a title be given that shows at once the character of the article.

Now I hope the next time *you* write a paper, that, when you have finished it, you will ask yourself, what is my paper about? Then give, in as few words as possible, such a label, that "he who runs may read."

G. L. P.

THE DRILL, OR VENT-HOLE.

Whether the drilling of a so-called vent-hole may be at times justifiable or not, we suppose must be decided by each operator for himself. As for ourselves we have no doubt in regard to it. We have not hesitated in the past, and presume we shall not in the future, at least, till the time comes when a *straight drill* will go straight to the apical foramen of a *crooked root.* We would prefer a clean root filled solid, but when that is *far* from a *possibility*, we find "discretion the better part of valor." But one may inquire, if the drill-hole is decided on, how and in what location of the tooth shall it be drilled?

In our opinion, the location should be just under the margin of the gum, so that the gum will *completely* cover it. This, for two reasons: First, by this means the free entrance of air with the ever present germs is prevented, thus reducing putrescence to the minimum extent. Second, it is less liable to become closed through the forcing in of food or any extraneous matter.

In a single rooted tooth, the drill should take such a direction as to enter the canal at least one-third the distance from the cervix to the apex. In other teeth, sufficiently high, so that the bulbous portion of the canal may be filled without closing the vent. In filling, first place a piece of wire or pin of such length that, when fully in, the head will be close up to the tooth, to prevent filling material being forced so far as to cover the vent. For the molars, a suitably shaped piece of thin platinum may be placed over the opening of the root-canals, in addition to the use of the pin. After the filling, the pin is of course to be removed.

It is just as essential that a vent-hole should be arranged according to correct principles, as the complete filling of roots or of any other operation.

INFLUENCE OF PREGNANCY ON CARIES OF TEETH.

Dr. Dogajew combats the idea that the more common occurrence of diseases of teeth in the pregnant is due to greater absorption of lime-salts. The absorption of lime-salts in the teeth goes on in connection with the development of the granular tissue, as in normal development, in carious processes during elongation of these teeth which have lost their antagonists, and during the resorption in old age. This resorption of lime-salts takes place uninterruptedly from the outer layer to the inner ones, without affecting the normal ones. Dogajew investigated 870 teeth, extracted from pregnants, and found nowhere a deviation from the other diseases of the teeth. He could also observe that absorption always takes place in the manner indicated. The teeth of children contain less lime-salts than those of adults, yet diseases of the teeth are not more common with them than with the latter. The point of importance seems to be the preservation of the enamel. He finds the disturbances in the *secretive* processes which occur in pregnant women are alone sufficient to account for all the increase in caries; without that, it would be needed to require some special influence only active during the time of pregnancy. There is, of course, but one sure preventive of this affection.

"THE TRUE HISTORY OF RUBBER DAM."

We publish elsewhere, in this number, the statement of Dr. W. T. La Roche, under the above heading, together with the affidavits, which are substantially the same that he read before the First District Dental Society of New York, November 6, 1883, and on which we made editorial comment in the January issue of this journal. We very readily give place to Dr. La Roche, in order that both sides may be accorded a fair hearing and that those who are sufficiently interested may see upon what our strictures were based.

Admitting that Dr. La Roche did invent and personally use, in his own office, rubber dam, in 1857, *what of it?* The profession never heard of it through him, and there is not an iota of evidence that it ever would have done so. Our position was, and is, taken on that point. It is not a matter of interest to the profession, and with this we drop it.

NEWSPAPER ANATOMY.

One of our daily newspapers recently, in reporting an accident where a man was wounded by the contents of a shot-gun, said: "The *cartoid vein* was just missed by forty-six shot which entered the face and neck." A writer in the *Medical Record* made a collection of this class of knowledge as displayed by the non-medical press at the time of Garfield's assassination, from which we select that portion which relates to the glands involved during the progress of the disease: "*Salwary conglomerated*, the *sympathotic*, the *partoid—parotitid—paratodit*, one of which it was feared would *sulphurate*, while in the case of another *suppuration* was expected." G. L. P.

We give in this number the article, by Dr. Miller, that appeared in the *Independent Practitioner*, of February, for two reasons: First, because of its value; Second, because it is an excellent answer to the article that appeared in the January number of the same journal, by the same author, in criticism of a late paper by one of the editors of this journal.

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We are obliged, for lack of room, to let our "Book and Pamphlet" notices go over to the next number—also much other matter that we hoped to be able to use in this issue.

CORRESPONDENCE.

Editor New England Journal.

DEAR SIR: I have just been reading an article in the *Southern Dental Journal*, of this month (Jan.), by J. R. W., and hardly know whether to laugh or cry, as either expression might be indulged in feelingly. The old story of *mercurial poisoning* has been harped on for these many years, and seems never to run dry. We have probably heard as much and read as much on the subject as most dentists, and yet have not learned of an identical case where mercurial poisoning was absolutely proved. On the other hand, we have seen precisely the same results in mouths where *black* rubber was worn, and, if mercurial poisoning was present, it came not from the dental plate, but without doubt from the medical practitioner, where it usually finds its source. Have I never seen sore mouths under rubber plates? I am not wilfully blind, and therefore have seen enough to fill one with pity and perhaps anger. It is best, however, to look at things in a candid light, and not with a preconceived opinion, in accordance with which everything must be wrought out. We have employed the various bases on which teeth are mounted, and at times find that probably all of them cause inflammation of the parts covered. If inflammation resulted from a rubber plate of so serious a nature as to require a change, we should hardly rise to advise celluloid, for in this section of country celluloid proves as insidious an enemy as rubber. What would J. R. W. say to the case of a lady who, in about one year from having teeth out and celluloid plate substituted, lost in weight some seventy-five pounds—she previously weighing about two hundred? After this reduction, the plate was left out for six weeks, and a gain of eight pounds took place. This case we know of, and can attribute the experience to nothing but the celluloid, though it would not be safe to dogmatically declare it such.

We claim that most of the bases in present use have their good features and should be used in their proper places just as much as the different filling materials in theirs. We claim that for the majority of cases a well-constructed gold plate is the most healthful, permanent, and comfortable. In special cases, Reese's metal, Watt's metal, rubber and celluloid, and combinations of the same, have their advantages. If from any circumstances a base may be necessitated which at times gives rise to certain abnormal conditions, the same should be stated to the patient, and guarded against. Then, if the ill results follow, resort to some other base that cannot be appealed from.

From what we many times read and hear, we should infer that the mercury in a red plate must be *immense* in *quantity, and evaporate very rapidly* or, on the other hand, *Homeopathy* takes the lead, and the *high attenuations kill.*

As regards the cancer case mentioned by the writer, we can see nothing decisive about it, and if the M. D. in the case bears any resemblance to the M. D.'s in this section, we should still dissent from the assertion. We have some fine M. D.'s in this section, but, as regards diseases of the mouth, we have lots of "points" on them, and should hardly care to treat cases on the basis of their diagnosis. They have many things to yet learn, as well as ourselves, so it is not best for us to be too fast at "throwing stones," but see to it that we are builded on a sure foundation, and that our house is not "glass."

N. MORGAN, D. D. S.

LETTER FROM NEW YORK.

To the Editor of the N. E. J. of Dentistry:

The First District Dental Society had a very instructive and entertaining meeting on Tuesday evening, Feb. 5, President Northrop in the chair, and members and guests to the number of sixty in attendance. The minutes of the last meeting having been read, the report of the chairman of the Clinical Committee, Dr. Bödecker, was given, and the large number of dentists reported as present, about 130, shows the popularity these clinics have deservedly attained. They are given at the Ninth Street rooms of the S. S. White Dental Manufacturing Co., in the afternoon of the first Tuesday of each month, the First District Society holding their meeting in the evening of the same day.

The clinic of Feb. 5th was particularly interesting, as many peculiar cases met with in private practice were exhibited, some difficult operations were performed by the use of methods peculiar to the operator, and a few new inventions and appliances were shown.

Late in the afternoon, Prof. Louis Elsberg, who will be remembered as one of the first distinguished histologists to accept Carl Heitzmann's views, and who, indeed, suggested to Heitzmann the term "bioplasson" as a name for his "reticulum," gave a very interesting lecture upon "Syphilitic Affections of the Mouth."

After the reading of Dr. Bödecker's report, a prominent member of the society asked the President for information in regard to a number of patents which, within the last few years, have been granted to the so-called "Sheffield Tooth Crown Co." upon processes and methods which he and hundreds of other dentists have used for many years. In the present disgraceful troubles between the Sheffield Company and the Richmonds, said the member, these patents are being pushed into legal prominence and defended as "true blue" first discovery patents. Is there or not, then, he said, danger for us in the future, and are we to be obliged to discontinue the use of methods as old, nearly, as our own professional life, through the existence of patents granted to unscrupulous men upon incomplete evidence?

President Northrop called upon the younger Richmond, ("there are two Richmonds in the field," you know,) who was present, to give what information he could in answer to the member's inquiry, and that gentleman, after considerable personal history, gave it as his opinion that the patents in question were obtained through fraud, his brother, the elder Richmond, having been induced to sign papers the contents of which he knew nothing, and who, now that he had perjured himself, had fled the country.

The members of the profession at large were invited to make the young Richmond's private woes their own, and the use of evidence collected by him for his own defense was offered them with which to fight the objectionable patents.

The essay of the evening was by Dr. W. H. Atkinson, who, at the invitation of the society, had written upon "Loose Teeth," and a masterly presentation of the subject it was. As no course of treatment can be safely decided upon either by the physician or dentist, until he has fully and correctly diagnosed the case, it was particularly fitting that Dr. Atkinson should first trace the gum tissues from health through their pathological changes, and describe and give the different reasons for the loss of the bony sockets of the teeth by necrosis. The essayist advocated the thorough removal of any tartar which might be present, in a careful manner, so as to injure the soft parts as little as possible, quite the reverse of the Rigg's treatment, but of much greater importance does he consider the tying of the teeth one to another with floss silk, and drawing them into the positions they formerly occupied. A stone in the engine should then be used to grind away such portions of the teeth as may interfere with their proper articulation by reason of any elongation which may have taken place, and they should be ground until the occlusion will give pressure upon each tooth in the direction of its axis of greatest strength. This treatment, Dr. Atkinson claims, is enough to cure many cases, as it gives all the teeth their proper share of work, taking away, too, the irritation which their occlusion—when sore, elongated and tipped—causes so constantly, and gives it as his experience that many patients who have not been able to eat a meal for months without suffering great pain, have, the day after such treatment, eaten with comfort and pleasure.

At a subsequent sitting, Dr. Atkinson recommends filling the gum pockets with aromatic sulphuric acid, and in extreme cases inserting an appliance to protect the healing gums from contact with the food, so that the embryonal elements may take on the form of their surroundings and make new gums.

The paper was well received and the discussion quite general.

D.

A CASE IN PRACTICE.

Mrs. G. applied to me to have several teeth and roots extracted, one of which was part of the left upper second bicuspid. I administered nitrous oxide, and left this root for the last. It immediately gave way, and I supposed it had slipped through the forcep. After the flow of blood had ceased, I made an examination of the mouth, and was surprised to find, to all appearances, this root in place. On wiping off the blood with cotton, the root disappeared, falling back into the antrum. After working some time, I at last succeeded in removing it by cutting away alveolus and some of the root. It was very much like a cork in a bottle, very difficult to hold. Having seen nothing similar reported, this may interest the readers of the JOURNAL.

J. K. W.

SOCIETIES.

VERMONT STATE BOARD OF DENTAL EXAMINERS.

This board will hold their second annual meeting at the Welden House, St. Albans, Vt., Wednesday, March 19, 1884, at 10 A. M. Applicants for license are requested to report promptly at that time. No license will be issued during the session of the Vermont State Dental Society. As this will be the only meeting of the board this year, dentists are requested to notify all who intend to go before the board.

R. M. CHASE, *Sec. Board of Examiners.*

VERMONT STATE DENTAL SOCIETY.

The eighth annual meeting of the Vermont State Dental Society will be held in the parlors of the Welden House, St. Albans, Vt., March 19–21, 1884. Members of other societies, and of the profession generally, are invited to attend and take part in the proceedings.

THOS. MOUND, *Secretary.*

NEW YORK ODONTOLOGICAL SOCIETY.

The February meeting of the Odontological Society of New York was held on the 19th, at the residence of Dr. W. E. Hoag, 3 East 43d street. The paper of Prof. Thomas Fillebrown, of Boston, was the prominent feature of the evening. Subject, "Gold as a Filling Material, and its Manipulation." He advocated the use of gold, and of hand-pressure in its introduction, by a method similar to that of Dr. Shumway, of Plymouth, Mass., but with steel points instead of ivory. The suggestions of the author were commended by several speakers.

Dr. Kingsley showed some very handsome specimens of lower artificial dentures, the teeth being mounted with rubber on cast plates made of an alloy of tin, which he originated and of which he gave the formula.

Dr. J. Morgan Howe spoke briefly on the subject of Antiseptics in general and Dental Surgery, referring especially to the use of iodoform and of peroxide of hydrogen (H_2O_2) in the treatment of certain classes of "dead teeth."

TRANSLATIONS.

MICROBES.

BY DR. H. FOL, OF GENEVA.

[From the Journal de Geneve.]

"The number of substances that are less injurious to man than to micro-parasites is small. The best disinfectant is perfectly useless if too weak a dose be used. For each of these substances there is one proportion which will destroy the germs, and another which will arrest their vegetation but not destroy them. This last dose is the one with which we are generally obliged to content ourselves. The experiments of Koch and Miquel show that the narcotic effect begins to be effective on microbes only when the substance in which they are vegetating contains, among a thousand parts, 95 parts of absolute alcohol, or 70 of borax, or 10 of salycilate of soda, or 3.2 of phenic acid, or 5 of quinine, or 0.6 of bromine, or 0.07 of bichloride of mercury, or 0.05 of oxygenated water, and even these at stated ratios of time. Certain of the substances indicated are useful in these doses; while others, as bromine, are impracticable. But especially let us not forget that the result is not a radical disinfection; it is merely a momentary weakening. Is it still needful to insist on the utter uselessness of too mild doses? We are constantly seeing phenic (carbolic) acid used in less than one part in a thousand with the sole effect of creating a mistaken sense of security. Let me mention another almost unknown antiseptic: essence of terebinthine, which, according to Koch, arrests the vegetation of microbes in a dose of one part in 75,000, a quantity easily endured by man. All these hygienic precautions are bristling with difficulties."

◆

SOLIDIFIED CREOSOTE FOR TOOTH-ACHE.

Creosote is a popular remedy for tooth-ache, but its excessive fluidity often occasions severe accidents. This may be prevented by gelatinizing it by the addition of collodion, 10 parts to 15 of creosote. In this way we get a sort of jelly which, besides being more manageable than plain creosote, forms a varnish which covers the orifice of the troublesome tooth and keeps air and moisture from its exposed nerve. —*Progres Dentaire*.

SELECTIONS.

FERMENTATION IN THE HUMAN MOUTH; ITS RELATION TO CARIES IN THE TEETH.

BY DR. W. D. MILLER, BERLIN, GERMANY.

[Reprinted from the Independent Practitioner.]

During the last two years I have stated at different times and places, as the result of many experiments, that "the first stage of dental caries consists in a decalcification of the tissues of the teeth by acids, which are for the greater part generated in the mouth by fermentation." The object of the investigations described in this and the following papers is to determine this ferment, and the conditions essential to its actions. I shall seek, in what follows, to present no views which are not the legitimate and necessary results of rigid and exact experiment, and I shall give in detail a description of each series of experiments, in order that every one may have an opportunity to judge of the accuracy of the work and the justice of the conclusions drawn from it.

It is, nevertheless, with some hesitancy that I venture to present before the dental profession the results of my last six months' labor, having learned by experience the almost endless number of agents which combine to vitiate such a series of experiments as that which I am about to offer, and the exceeding great care which is necessary in excluding or eliminating all irrelevant factors.

If, therefore, I have been guilty of any oversight, or failed to take all possible precautions to guard against error, I hope that some one will kindly show me where I have gone astray, and put me in the right course again.

The larger apparatus necessary for these experiments are:

1. A large double-walled incubator, with gas regulator for maintaining any desired constant temperature.
2. A Koch sterilizer.
3. A damp chamber. (See Fig. 1.)

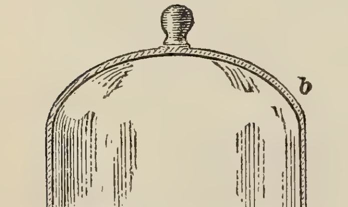

FIG. 1.—Damp Chamber. *a*, shallow glass vessel partially filled with water. *b*, glass globe lined with wet bibulous paper. *c*, metallic stand for culture tubes.

4. A drying oven for sterilizing instruments, glass vessels, etc., at a temperature of one hundred and fifty degrees centigrade.
5. A good microscope, with either water or oil immersion.

It is not necessary to mention the smaller instruments, glass vessels, etc., etc., nor the apparatus necessary for making a chemical analysis of the products of the fermentation; these are sufficiently familiar to every one.

To avoid repetition, I will say here that *all* vessels and instruments used in the culture experiments were purified in the flame of a Bunsen burner, when practicable, otherwise by exposing for fifteen minutes in the drying oven to a temperature of one hundred and fifty to one hundred and sixty degrees centigrade (three hundred and two to three hundred and twenty degrees Fahrenheit), and that all substances used as culture substrata were sterilized four times by exposure, at intervals of twelve hours, for half an hour, to steam at one hundred degrees centigrade, in a Koch sterilizer. Furthermore, all infections from carious dentine were made as follows: The cavity of a freshly extracted carious tooth is cleared of food, and carefully brushed over with a pledget of cotton dipped in carbolic acid (ninety per cent). The acid is then thoroughly absorbed by means of bibulous paper, and layer after layer of the soft dentine removed with a repeatedly purified instrument, until the deeper parts are reached; then, a portion of the clean soft dentine, scarcely as large as a pin-head, is removed, and quickly brought into or upon the culture medium.

Infections from the mouth were made by scratching upon the surface of the mucous membrane of the cheek, or the margin of the gum, with the end of a clean platinum wire, and then dipping it into the culture medium. The materials used for culture were:

No. 1.	Sterilized saliva,	50.0;
	Sugar,	1.0;
	Starch,	0.5.
No. 2.	Sterilized milk.	
No. 3.	Decoction of malt,	50.0;
	Sugar,	1.0.

The malt decoction is made by boiling, with slight evaporation, 20.0 dry malt with 12.0 water for ten minutes and filtering.

No. 4.	Sterilized saliva,	50.0;
	Water,	50.0;
	Starch,	20.0;
	Sugar,	2.0.

The starch is added to the cold solution of water and saliva, and stirred until it becomes evenly divided throughout the solution; it is then poured into shallow glass vessels with glass covers, and put into the sterilizer for complete sterilization; it there congeals and forms a solid mass, upon the surface of which the infections may be made. It possesses all the advantages of gelatine, with one great additional one, in that it does not liquify at blood temperature.

No. 5. Decoction of malt, 100.0;
Sugar, 2.0;
Starch, 20.0.

Prepared in the same way as No. 4.

No. 6. Beef extract, 2.0;
Water, 100.0.

No. 7. Water, 100.0;
Beef extract, 2.0;
Sugar, 2.0.

No. 8. Fresh baked potato, cut into slices one-half inch thick, with a clean knife.

Other substances were used, but need not be considered here. Additional sugar is not absolutely necessary where malt is used, though I have, so far, obtained better results by adding a small quantity. The kind of sugar is immaterial, provided it be fermentable; even cane sugar, though not directly fermentable, is converted into a fermentable variety in the culture. Where small quantities of any culture material were used, the cultures were kept in the damp chamber to prevent their drying up or becoming too concentrated by evaporation. All cultures were made under a temperature of thirty-six to thirty-eight degrees centigrade.

We will begin with the fundamental experiments.

Exp. 1. Fresh saliva is mixed with sugar or starch, one to forty, and kept at blood temperature. It invariably becomes acid in four to five hours. But some one, no doubt, will say that this is a result of no consequence, because the experiment was not made within the oral cavity; for his personal benefit we give the following:

Exp. 2. A glass tube two c. m. long and three m. m. wide, is filled with starch, sterilized, and fastened to a molar tooth in the mouth on going to bed; next morning the contents of the tube will have a strong acid reaction. A cavity in a tooth, or a piece of linen, which may be saturated with a solution of starch, will answer the purpose as well as the glass tube. That the acid is the same in each case will be further established below.

Exp. 3. The mixture of saliva with starch or sugar, is kept for a half-hour in the sterilizer at one hundred degrees centigrade, and then placed in the incubator; it does not become sour in four, nor in twenty-four hours; in fact, not at all. We conclude that the ferment is rendered inactive by a temperature of one hundred degrees centigrade.

Exp. 4. The starch is heated to one hundred and fifty degrees centigrade before mixing with the saliva; the solution still becomes sour. Conclusion: the ferment exists, not in the starch, but in the saliva.

We have now to determine the question: Is it an organized ferment (fungi), or is it an unorganized ferment (ptyaline)?

This question is determined by the following experiments:

Exp. 5. From six to eight grams of saliva are agitated in a test-tube with as much sulphuric ether as it will take up, starch added, and the whole put in the incubator. On examination, after a few hours, we will find sugar in the solution, but no acid; in other words, the acid-forming ferment has been rendered inactive; but the unorganized, sugar-forming ferment, not.

Exp. 6. Instead of ether, enough carbolic acid is added to make the solution one-half per cent. strong; the result is the same. These two experiments show that the ptyaline of the saliva (which was not injured by the presence of the ether or the carbolic acid, as proved by the fact that it retained its diastatic action) is not the cause of the acid reaction.

Exp. 7. According to Paschutin, pytaline is devitalized by exposure twenty minutes to a temperature of sixty-seven degrees centigrade. Organized ferments could not be killed by the same means. We accordingly subject a mixture of saliva and grape-sugar to the given temperature for twenty minutes. We thereby destroy the ptyaline; the mixture, nevertheless, becomes sour if allowed to stand in the incubator for twenty hours.

This experiment confirms the result of experiments five and six, and we begin to suspect that we have to deal with an organized ferment. This supposition is confirmed by the following experiment:

Exp. 8. Six to eight drops of a perfectly sterilized solution of sugar in saliva (1-40), in a minature test-tube with cotton cork, are infected from the mouth, or with carious dentine, as described above; in twenty-four hours the solution will be acid; with a fraction of a drop of this solution a second tube is infected; it will likewise become acid; from this a third, etc., etc.; each becomes acid in turn, while the control tube (containing the same solution, not infected) remains neutral.

The conclusion is plain, that we have to do with a ferment which is capable of producing itself; in other words, an organized ferment. It therefore becomes evident that not only free in the mouth, but in the deeper parts of carious dentine, we have fungus which is capable of producing an acid reaction in characteristic substrata.

Exp. 9. Each of thirty small tubes were furnished with eight drops of solution No. 1, and each of thirty other tubes with as many drops of solution No. 3, and all were sterilized. Twenty-four were then infected from the mouth, twenty-four with carious dentine, and twelve were left as controls.

In twenty-four hours all forty-eight of the infected solutions were acids, while the twelve controls remained neutral.

Exp. 10. Make a solution of 40.0 of saliva and 1.0 of starch ; put equal portions in two flasks, *a* and *b*, and cover the surface of the solution in *a* with a layer of pure oil to prevent the free access of air ; or :

Exp. 11. Place flask *a* in an air-tight bottle containing a fresh alkaline solution of pyrogallic acid (which abstracts the oxygen from the air ;) or :

Exp. 12. Exhaust flask *a* by means of the air pump, so as to produce a tolerably complete vacuum. The quantity of acid produced in *a* will be, on an average, the same as that produced in *b*.

We conclude from experiments eight, nine, and ten, that the fungus in question is independent of the free access of air or oxygen for its development and characteristic action, a conclusion which would exclude the fungus of vinegar (*mycoderma aceti*), and which is of the utmost practical importance, since it signifies that this fungus can develop and perform its work deep in the dentinal tubules, or under fillings, provided the necessary materials are furnished it.

Exp. 13. Place a piece of carious dentine upon the surface of the culture material described in number four, five, or six ; in twelve hours the dentine will be surrounded by a white ring, from four to eight m. m. in diameter ; the material within this ring will be partially liquified, and have an acid reaction. The same result follows when the infection is made from the mouth.

Exp. 14. Produce 10.0 of saliva by chewing a sterilized quill toothpick, add 0.5 starch or sugar, and place in the incubator. Then give the oral cavity a most thorough cleansing with pure water, using toothpick, brush and floss, the object being to free the mouth from micro-organisms as completely as possible. Then produce again 10.0 saliva, add 0.5 starch or sugar, and put in the incubator. The amount of acid produced in a given time will, in the latter case, be often as low as one-fourth of that in the former. Conclusion : By thoroughly cleansing the mouth we, no doubt, remove the greater portion of the fungi, hence the small amount of acid produced. By using strong antiseptics, or by repeatedly filtering the saliva, we may reduce the amount of acid produced in twenty-four hours almost to o. An experiment yet to be made is to take the saliva direct from the gland, before it becomes infected with the organisms of the mouth; it should not then become sour when mixed with starch and allowed to stand at blood temperature. In every case a careful microscopic examination of the cultures was made, revealing the constant presence of a fungus, chiefly in the form of diplococci, either single or in chains, less often in form of bacteria, bacilli, or even threads. (See Fig. 2.)

Sometimes all these forms are found on a single thread, thus proving what I have already demonstrated for *leptothrix buccalis* and *leptothrix gigantea* (Miller), the genetic connection of these different forms. The particular form in which the fungus occurs depends somewhat upon the culture medium, as well as upon the age of the culture. By using a glass tube as culture vessel, we may demonstrate that whether the culture is made in the mouth or out of it, under similar conditions the fungus is the same. The fungus is not capable of producing an acid reaction of all substances in which it may vegetate. A luxuriant growth may be obtained in beef extract, but no acid is produced unless sugar is present.

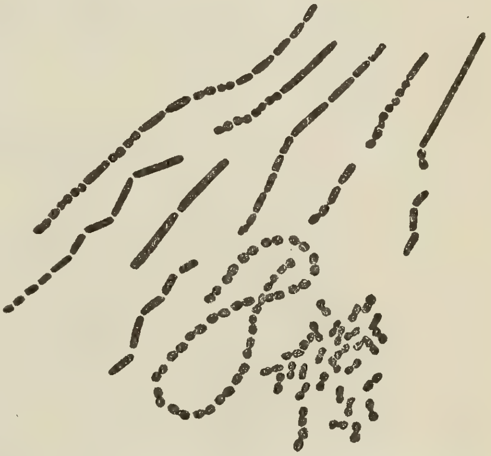
FIG. 2.—Some of the forms in which the fungus, treated of in this article, occurs.

It is only from carbo-hydrates (especially sugar) that it appears to be able to produce acid in any considerable quantity, or at all. This question, however, as well as the morphology, physiology, development and life conditions of the fungus, will receive consideration in a separate number.

We have, then, a micro-organism which agrees morphologically with the *bacterium acidi lactici*, and which, without the presence of oxygen, produces acid from sugar, so that we would probably not be far from right if we were to say that the organism in question is simply the fungus of lactic acid; we will, however, reserve our decision for the following number, where the analysis of the product of the fermentation will be given, that being the one *sure* method for determining the species of any ferment bacterium.

In all cultures, it is of course essential that the culture-substratum be neutral when the inoculation is made ; should it be acid, it must be neutralized. This is best accomplished by very carefully adding the carbonate of sodium. Without this precaution it would be somewhat difficult to determine whether acid had been produced by the action of the fungus or not.

In the light of these experiments the thorough decalcification of the tooth substance in caries is easily accounted for. The saliva is, no doubt, always, particularly in mouths of uncleanly persons, impregnated with sugar, either taken directly into the mouth, or formed there by the action of the ptyaline of the saliva upon starch. The question of the presumable diastatic action, as well as of a presumable inverting power on the part of the organisms themselves, will be considered in the chapter on Physiology.

Wherever this stagnates between the teeth, in fissures, etc., etc., especially during sleep, it *must* become acid. When a portion of the dentine has become decalcified, it, as is well known, takes up the liquids of the mouth and the fungi with them like a sponge, and the fungi, being independent of the free access of air, go on producing acid within the dentinal tubules. As each layer of dentine becomes softened in turn, the micro-organisms *follow after*, continually producing new acid. Hereby the zone of softened, non-infected dentine is readily understood. The production of acid is entirely independent of the reaction of the saliva as it enters the mouth, hence the uselessness of "testing the saliva" for acids. That the liquid squeezed out of the tubules of *decaying* dentine has an acid reaction, every dentist in America who has a piece of blue litmus paper and is not color-blind, can easily prove for himself.

The result of experiment six plainly shows one cause of the good effects which the profession has seen from the use of carbolic acid.

The fact that a pure culture was obtained in most cases by the first inoculation, seems to indicate that the fungus exists in a state of tolerable purity in the deeper parts of the carious dentine. This question will, however, receive consideration later. The action of the fungus upon substances which contain no carbo-hydrates will also be considered under Physiology.

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ORIGINAL COMMUNICATIONS.

THE BACTERIA.

CHARLES S. BOYNTON, M. D., BRANDON, VT.

[Presented to the Vermont Dental Society, at the annual meeting, 1883, and revised for publication by request of the Society, January, 1884.]

Continued from page 91.

Accepting, then, their plant nature, and leaving naturalists to settle their exact phylogenitic relationship, let us proceed to a consideration of some of their most prominent characteristics. No other living things in nature are so widely distributed throughout the world. "So commonly and multitudinously present, near us, and on us, and in us, as the various microscopic organisms of which we write, in countless numbers they exist in all filth, in decomposing vegetable and animal matter, ill-scented or not; in all organic substances undergoing so-called spontaneous change; and wherever we find those changes known as fermentation and decay, we find the special home of peculiar kinds." Upon cooked articles of food left for some time they form a slimy, colorless or colored coating which, even with the naked eye, is easily distinguished from the snow-white web-like mould fungus, with its spore powder of blue and white.

"Brewers' yeast, used in bread-making, is not a *bacterium*, but is a related growth; and the so-called self-rising yeast, not unfrequently used in making bread, owes its energy to living bacteria. Sour milk always contains swarms of the microscopic moving things; and in the formation of vinegar from the juice of fruits, or from solutions of spirit and sugar, they are always present in vast numbers. They are invariably present in pus from open, suppurating wounds; in the discharge from boils and tumors, on and in our own bodies, and in the ill-scented accumulations of the body excretions. No one would wonder why the breath sometimes smells bad if the material collecting on the teeth, or the fur on the tongue, could be seen under a good microscope. The cleanest human mouth can hardly be said to be ever perfectly free from these active organisms; while those mouths to which the tooth-brush or its equivalent is a stranger, are the veritable culture boxes, or hot-houses, richly supplied with rapidly growing and prodigiously multiplying forms and kinds."

History tells us that from time to time a drop of blood would form on food, and especially bread, which increased rapidly, spreading over large surfaces. This occurring in ancient times, to the myth-forming fancy of the people, it was believed to be the sign of threatened disaster, showing the anger of God, disclosing secret guilt and calling for bloody atonement; and history records numberless sacrifices which till recent times fell to this superstition, as often as this wonder of blood was seen on food, but especially if on the consecrated wafer. A century of enlightenment has passed, and the blood wonder has gradually ceased; but with only the last few years do we know that the wonderful account had foundation in a fact of science. We now know the red slime to be composed of numberless little oval bodies—red spherical bacteria. They nourish themselves on the albumen contained in the food on the surface of which they develop, decompose the same, and generate by a peculiar pigmentary fermentation the red coloring matter, which possesses a striking relation to that brilliant aniline color, which is of so much value to the coloring industry.

Bacteria are killed by a temperature of 140° F., only the temperature must continue long enough to make sure that the whole mass has been penetrated, and not a single bacterium has escaped destruction. If the bacteria in a solution are killed and the introduction of new germs prevented, the liquid remains unchanged and putrefaction never takes place. Thus it is concluded from experiments often repeated, and always with the same results, that putrefaction does not take place if no bacteria are present; and, on the other hand, the multiplication of them cease as soon as the substances capable of producing putrefaction are destroyed. Therefore, bacteria are not the chance companions, but rather the cause, of putrefaction, which may be defined to be "a chemical process excited by bacteria." *Death does not, as is generally supposed, cause putrefaction, but rather it is caused by the life of these invisible organisms.* The ancients believed that Apollo in his anger darted invisible arrows among his enemies, "prostrating men and cattle." The savage nations attribute diseases and scourges of the human race to the influence of evil spirits. "Thus extremes often meet." What human intelligence at first suspected, in its early attempts to reason from cause to effect, has been verified by the same intelligence in its higher development. Again, we have come to a belief in evil spirits; but these destroyers have assumed a tangible shape.

Leeuwenhock had scarcely made known his first observations upon the invisible creatures in putrid water before the physicians of his day began the promulgation of the theory that the frightful enigma of epidemic diseases was explained through the wafting of microscopical diseased germs. The discovery of these low forms of life in the mouth is not of modern origin, as we can see by the following extract from the writings of Leeuwenhock, written in 1682, at the age of fifty years. He says: "It is my custom every morning to rub my teeth with salt and afterward to wash my mouth, and after eating I always clean my large teeth with a tooth-pick and sometimes rub them very hard with a cloth. By this means my teeth are so clean and white that few persons of my age can show so good a set; nor do my gums ever bleed, although I rub them very hard with salt; and yet I cannot keep my teeth so clean but that, upon examining them with a magnifying-glass, I have observed a kind of white substance collected between them, in consistence like a mixture of flour and water. In reflecting on this substance, I thought it probable (though I could not observe any motion in it) that it might contain some living creatures. Having therefore mixed it with water which I knew was perfectly pure, I found to my surprise that it contained many small animalcules, the motion of which were very pleasing to behold. The largest sort of them had the greatest and quickest motion, leaping about the liquid like the fish called a jack; the number of these were very small. The second sort had a kind of whirling motion, and sometimes moved in the direction of a spiral and undulating; these were more in number. Of the third sort, I could not well ascertain the figure, for sometimes they seemed roundish, but oblong, and sometimes perfectly round. These were so small that they did not appear larger than a speck. The motion of these little creatures, one among another, may be imagined like that of a great number of gnats or flies sporting in the air. From the appearance of these to me, I judged that I saw some thousands of them in a portion of liquid no larger than a grain of sand, and this liquid consisted of eight parts water and one part of the before-mentioned substance taken from the teeth. With the point of a needle I took some of the same kind of substance from the teeth of two ladies who I knew were very punctual in cleaning them every day, and therein I observed as many of these animalcules as I have just mentioned. I also saw the same in a white substance taken from the teeth of a boy about eight years old, and upon examining in like manner the same substance taken from the teeth of an old gentleman, who was very careless about keeping them clean, I found an incredible number of living animalcules swimming about more rapidly than any I had before seen, and in such numbers that the water which contained them (though a small portion of the material taken from the teeth was mixed with it) seemed to be alive."

When we consider that this description was penned two hundred years ago, and at a time when microscopy was little known, and the compound microscope had not then been invented, we can but acknowledge the truth of the text—"There is no new thing under the sun."

I received in January, 1882, a letter enclosing a slip cut from the Boston *Globe,* bearing date of December 16, 1881, which announced in flaming head lines, *A new dental theory—The decay of teeth due to the ravages of bacteria—Excavation and teeth-filling soon to be superseded—Myriads of animalculæ playing tag between our teeth.*

The writer of the note accompanying this slip, says: "It seems that, after all, the botanists are at fault with their classification; *plants* don't play tag, neither do they swallow each other just for amusement. This 'New Yorker' has 'knocked' a big hole in somebody's theories." I read the article carefully, and was satisfied that either this Dr. Clark, spoken of in the article, was a myth, or the reporter had taken upon himself the task to describe things with which he was not familiar, and had become "mixed." After thinking the matter over, I wrote Dr. Clark, and in due time received the following reply: "I was interviewed several times last winter, and particularly by the writer to whom you refer, who seemed to be highly interested in my microscopical investigations, but as a student of bacteria you know how easy it is to get these little organisms out of place and your investigations unintentionally misrepresented. I have been at work on bacteria of the mouth at different times for about twenty years, and have written several papers, the last read before the American Convention at Saratoga. In this paper as well as the former ones, I took the ground that caries of the teeth is caused by bacteria. Through fermentation one organism after another is introduced, until the final one of putrefaction, *B. termo*, is brought into action. The bioplasm of the dentine becomes nutritive pabulum, and when this is absorbed, little but lime-salts and fragments of bacteria are left."

Here, then, we find two land-marks, two hundred years apart, 1682 –1882. Let us turn back and find what has been done by other investigators between these dates. Before entering upon this part of our subject, we wish to acknowledge our indebtedness to Dr. Thomas H. Chandler for his excellent translation of the investigations of Drs. Leber and Rottenstein, from which we obtain the following facts :

The ancient physicians, the dentists of their time, who engaged in inquiry of the causes of dental caries, confined themselves to making hypotheses more or less ingenious, and then founded them on experience and clinical observation. True investigation could only become possible when the histological structure of the dental tissues was known. Two hypotheses held a balanced sway—one, *chemical*, explained caries by the action of chemical agents, acids in particular ; the other, *vital*, considered it as a veritable malady, caused by an organic change, and the reaction of the dental tissues against an external irritation. These different opinions remain to-day unsolved in spite of the researches which have been made on the subject. As early as 1846, Ficinus and Klencke entertained the idea that caries of the human teeth was in some way influenced by the lower forms of life, which may always be found in the oval cavity. Ficinus attributed dental caries to a putrefaction produced by the minute animalcules of the mouth, and to which he gave the name, *Denticola*. These, he maintained, attacked the enamel cuticle, consumed the enamel itself, and afterward the dentine. The investigations of M. Klencke were published a little later, in which he adopts several opinions offered by M. Ficinus, and sub-divides caries into three kinds : First, Soft caries, caused by putrefaction ; Second, A soft caries, due to the proliferation of a vegetable called "*protococcus dentalis*" (later observers have failed to identify this parasite) ; Third, The so-called dry caries, caused by chemical action of acids on the dental tissues, with which the parasites have nothing to do. Soon after Mr. J. Tomes published, and for the first time in the history of dentistry, accurately described the histological alteration of the dental tissues in caries. Then comes the observations of M. E. Newman. These observations bear almost exclusively upon the caries of dentine; that this affection has in part an inflammatory nature; that the injurious agents irritate the dentine and produce phenomena of organic irritation, which end by causing the destruction of the tissue.

At the beginning of the year 1868 appeared the "Treatise upon Dental Caries," by M. E. Magitot. This author attempts to prove that the acid contained in the saliva, or mixed with it, is the cause of dental caries, and that the nature of this affection is consequently purely chemical. He does not even mention the alterations described by Tomes and Newman, and contents himself with saying that the canaliculi contain sometimes a finely granulated substance. He attaches great importance to the calcareous deposits in the interior of the canaliculi, and considers them as the result of secretion from the irritated pulp. While the enamel is disappearing under the action of acids, the irritation is conveyed across the dentine even to the pulp which, reacting, throws out a calcareous exudation.

The same year, Drs. Leber and Rottenstein published "An Investigation into the Influence of Fungi in the Destruction of the Teeth." These investigators concluded that the action of an acid, or acids, was not sufficient to explain all the phenomena associated with caries of the teeth, but that the elements of the fungus (leptothrix) easily work their way into the dental tubuli, which they expand, and thereby assist the penetration of acids into the deeper parts.

In Johnston's Dental Miscellany, for 1879, page 447, will be found an article by Dr. F. Y. Clark, in which he states the belief that decay of the teeth is produced by what he calls "dental bacteria," which he describes as having an almost imperceptible screw-like motion.

A. Weil is of the opinion that the leptothrix bores directly through Nasmyths's membrane, and then into the enamel.

Arthur S. Underwood and W. J. Milles consider that caries, as well as suppuration of the pulp and alveolar abscess, depends upon the presence and proliferation of micro-organisms. These organisms attack first the organic material and, feeding upon it, create an acid, which remove the lime-salts. These investigators are without doubt the leaders in the researches upon this subject now going on on both sides of the Atlantic. They are engaged at present upon a series of investigations which, when completed, will shed new light upon this problem.

Following closely in the footsteps of Underwood and Milles, verifying and extending their experiments, we have Dr. W. D. Miller, of Berlin, Germany. This gentleman has done more than any one else to bring the germ theory of dental caries to the notice of the dental profession. We give in his own words the summary of his paper published in the January (1883) number of the *Cosmos:*

"The general results arrived at may be summed up in the following paragraphs, partly in accordance with and partly contrary to the commonly accepted views:

1. The first stage of caries of the teeth, *i. e.*, the extraction of the lime-salts, is for the most part caused by those acids which are generated in the mouth by fermentation.

2. Decalcification of the enamel signifies total destruction of that tissue; of the dentine there remains after decalcification a tough, spongy mass, which becomes subject to the invasion of enormous numbers of fungi (leptothrix-threads, baccilli, micrococci, etc.).

3. The leptothrix-threads are found, with rare exceptions, only upon the surface, or in the superficial layers of the softened dentine, and appear to take but a small part in the invasion. The bacilli, on the other hand, penetrate far into the dentine, even into the finest branches of the canaliculi. Micrococci penetrate furthest.

4. In the separate tubules is frequently to be seen a gradual change from leptothrix-threads to long bacilli, from long to short bacilli, and from the latter to micrococci.

5. The fungi produce anatomical and pathological changes in the deeper layers, stop up the canaliculi, and necessarily lead sooner or later to the death of the dentinal fibrils. The outer layers of dentine, thereby deprived of nourishment, die and fall a prey to putrefactive agents.

6. The invasion of the fungi is always preceded by the extraction of the lime-salts.

7. The fungi have not the power either to penetrate or to decalcify sound dentine, so that the infection of a perfectly sound tooth by a carious one seems to be excluded.

8. We may accordingly look upon caries of the teeth as consisting of three stages: (1) decalcification; (2) infection and devitalization of the decalcified dentine; (3) putrefaction of the devitalized den-

tine; though it would not be easy to say just where one stage ceases and the other begins.

9. I have in a number of cases been able to establish the participation of the fungus saccharomyces mycoderma (?) in the carious process.

I do not, however, wish to be understood as saying that acids or pathogenic bacteria, or putrefactive bacteria, or all together, are the sole and only cause of decay of the human teeth. What I am prepared to say is this, that in my opinion there is not a single case of caries in which micro-organisms do not play some part, and that in the most cases they play a very important part."

Dr. Miller has changed his views somewhat since writing the above paper, and to those who wish to keep pace with the subject, it will repay them to study his several papers published since.

Dr. C. T. Stockwell, of the New England Journal of Dentistry, in a paper read at the Saratoga Meeting of the American Dental Convention, August, 1883, says: "Much of the misunderstanding on the part of the opponents of the germ theory arises from the lack of a clear, concise and sharp definition of caries, or from a confusion of ideas produced by not recognizing a distinction between predisposing causes and real caries itself." He asks: "What, then, is true dental caries? The question is not: What are the exciting causes, neither is it: What the predisposing conditions? But recognizing all these, where and at what stage of the process does real caries begin?" Here he takes exception to much of the language that has been heard in nearly every meeting in which this subject has been discussed. He claims that the simple or direct result of abrasion, erosion, lowered vitality, *effect of medicines*, acids, etc., *without the intervention of some other factor, is not caries*. He then makes this assertion: "*Dental caries does not begin until the putrefactive process of an organic portion of a tooth is set up.*" You will see by this definition that a clear distinction is intended between fermentation and putrefaction. He does not use the term fermentation in this connection, but says that both processes are impossible when the *micro-organisms* are eliminated. So, while the advocates of the acid theory—acids resulting from fermentation of food substances in the mouth—claim their process as the true one, they should not lose sight of the rôle of micro-organisms in the production of fermentation; while the *chemical theory*—"*grossly so*"—better known as the "pickling" process, is no longer advocated, for it is now known that bacteria are always on hand where any "pickling" is to be done. If they are destroyed by antiseptics, no caries follow.

Then follows a review of the microscopical investigations and investigators. As the pioneers in this branch of investigation, he very justly places the names of Underwood and Milles; then comes Miller, confirming and verifying their observations, though entering into *details* to the greatest extent of any one who has preceded him. So far as his observations have been published, he does not materially controvert the observations of Underwood and Milles. But the deductions based on these observations differ with the two observers, and this is, as to the details of the action of the *micro-organisms* present in all cases of decayed dentine. In answer to the query, "What is the condition of decayed dentine as shown by the most recent investigations?" we have, First, An outer layer, very irregular on its inner border, of infected dentine in which micro-organisms abound to a greater or less extent and to a greater or less depth; this is succeeded by a territory of varying depth free from organisms, but in a "softened" condition, as Dr. Miller terms it; beyond this layer is the non-affected or healthy dentine. This zone, this "terra incognita," situated between the carrious and healthy dentine, changed by something, but not infected, is the battle-ground at the present time given over to the war of "discussion and hypothesis." Perhaps one other question should be included —the invasion of perfectly normal tissue without the previous action of an acid to open the way to the dental fibrils, or at least, to the interstices between the enamel rods. The trouble would be apparent in attempting to answer the question, "What is perfectly formed enamel?" However perfect it may be to the unaided eye, under the glass it would oftentimes be found far from perfect. Allusion is made to the general misunderstanding of the position held by those who claim that *micro-organisms* are an essential factor in dental caries. The claim is, that the effect *simply* of acids is not *caries*, that some other agent must come in before what is *properly* termed dental caries can take place, and that is micro-organisms. While admitting the action of acids, all such action should be classed with the *predisposing conditions favorable to* caries. The action of acids alone cannot be considered a part of the process of true caries any more than a *congenital defect* or a *fracture* can be so considered. In other words, caries does not begin until the *putrefactive* process of an organic portion of a tooth is set up, and this process is dependent upon the action of low organisms.

So much for the literature of the subject. After this examination, we find ourselves in the position of the student who entered the old hall of the Sorbonne, in company with the Genevian Professor, Casaubon. "Here," said the student, proudly, "is a building in which men have disputed for more than four hundred years." "And," asked Casaubon, "*what has been settled?*" There is a significance in the question of the old professor. No question of this kind can be settled by a war of words. Patient, continued research, in which all who can should take part, will in time bring forth good results. In all of the discussions that we have read in your journals since the germ theory of dental caries has been brought forward, we have noticed that the opponents, and sometimes the supporters, of the theory came to the work without any definite knowledge of the life-history of the bacteria. In order to find out what these organisms are responsible for, we must first find out their true place in the economy of nature. We hear people talking of bacteria of the "mouth" and "teeth" as though they were especially created for the sole purpose of tormenting the patient and bothering the dentist, and endowed with no other object in life but to bore, break down and destroy our teeth from a spirit of innate wickedness with which they are possessed. If these persons would study the full meaning of the extract which stands at the beginning of this paper, and make themselves familiar with the biological history of the bacteria as they exist elsewhere, following carefully the rôle they perform in the world of organized beings, the company of honest doubters would be less.

Gentlemen, in leaving this subject, we hope that enough has been said to induce you to follow out this inquiry in the spirit of true investigation. Observe carefully what is going on each day before your eyes. Compare these observations with others working in the same field. Reflect upon the data obtained, and learn if possible the lessons taught, remembering that "He who never walks save where he sees men's tracks, makes no discoveries." And, lastly, keep a record of each day's progress, as it is by these written records that the march of progress is made universal.

CRITICAL REMARKS UPON THE MISSTATEMENTS AS TO INTERDENTAL SPLINTS, IN THE SURGICAL TREATISE OF PROFESSOR D. HAYES AGNEW, M. D.

BY THOMAS BRIAN GUNNING, D. D. S., NEW YORK.

34 East 21st Street,
New York, November 26, 1883.

To D. Hayes Agnew, Esq., M. D., L. L. D., Professor of Surgery in the Medical Department of the University of Pennsylvania.

Sir: In the preface to your recently completed work, "The Principles and Practice of Surgery," you say: "In the composition of its pages, while I have expressed my own views independently on all subjects, I have also endeavored, as far as was consistent with the scope and limits of the work, to record those of other writers, not only that the student and the practitioner may be made familiar with the literature of their profession, but also that they may be able in their observation and practice to contrast different plans of treatment, and in this way draw their own conclusions in regard to the relative merits of the various modes of managing surgical disease. Whatever may be the defects of the work—and none can be more sensible of these than myself—I have endeavored most conscientiously to furnish a safe and reliable guide for the surgical practitioner."

With this in view, those for whose instruction you wrote could not suspect that the work contains statements which are untrue, and mislead in regard to the treatment of any important injury. Yet the section on "Fractures of the inferior Maxillary Bone" contains such statements. To give a clear understanding of the matter to you, and to all who may read this letter, I quote from your article verbatim and remark upon the misrepresentations. In Vol. I., page 846, you refer to the interdental splints devised by me and used in treating fractures of the maxilla, as follows:

"Among the simplest of Gunning's splints are the forms shown in Figs. 642 and 643, which receive all the teeth of the lower jaw,

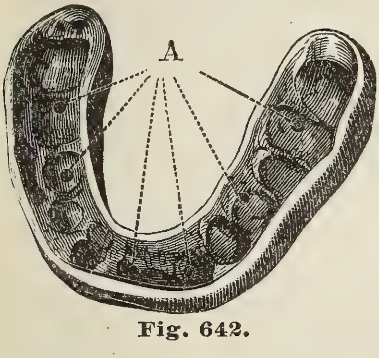

Fig. 642.

Gunning's Interdental Splint. A points to perforations for injecting water.

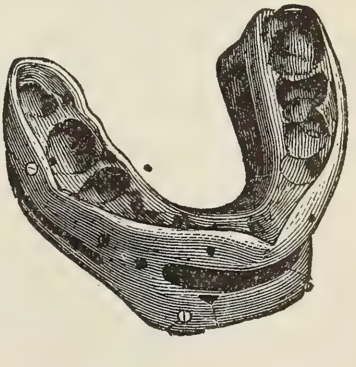

Fig. 643.

Gunning's Interdental Splint.

extend a short distance over the gum, and have perforations through which to throw a stream of liquid for the purpose of cleanliness. This splint when placed in position forms a cap, and is kept in place by securing the jaws together with a bandage, or by means of screws passed between the teeth."

Now my splint No. 1 (your figure 642), was expressly devised to be used without a bandage; it holds the fragments of the jaw in place by means of the teeth without anything external to the mouth, and it allows the jaw to move and to be used in eating and speaking; and this form of splint is adapted to the large proportion of fractures of the maxilla. If the patient can be depended on, never, however, if a child, this splint may in many cases only be fitted to the teeth, and without screws in or between the teeth, or any ligatures, the fragments of the jaw will be held firmly together. For in eating or in closing the splint against the upper teeth the muscles carry the broken jaw up and keep the fragments in place, the muscles and the surrounding soft parts forming a counter support to the interdental splints.

This splint, No. 1, was first applied on February 12, 1861. It was used on the jaw of a Spanish seaman in the naval hospital, New York, and it cured the patient, although he had been subjected to four months' unsuccessful effort of the government surgeons, assisted by others in the vicinity. Thus the surgeons were spared the mortification of sending the man home uncured. A similar splint was shown to the New York Academy of Medicine, January 7, 1863, with another case in which it was used, then published with illustrations in their Bulletin, and in February brought before the Medical Society of the State of New York, as shown in the Transactions for 1863; and in the Medical Report of the Centennial Commission, 1876, this splint was admitted to be the first splint ever used without an appliance outside of the mouth. Surely this splint should have been fairly reported and truly described in your work on "The Principles and Practice of Surgery." Had this been done, other sufferers could have the use of it; whereas, your book misleads the surgeon and student in regard to it.

Even in the few injuries where the fractures are such that it is necessary to use the upper teeth as a base to hold the broken lower jaw still, as in fractures in the ascending rami, or say all fractures back of the teeth, my splint No. 2, just now shown, is not kept in place, as you say, by securing the jaws together with a bandage. This splint,

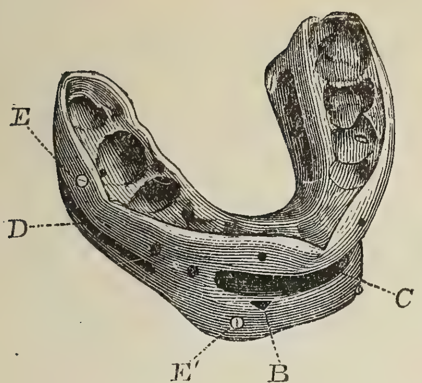

Fig. 2.

B, triangular opening, of which one side corresponds to the cutting edge of the lateral incisor, which tooth stood in the end of the fragment most displaced before the splint was applied. C, opening for food, speech, &c. D, channel for the saliva from parotid gland to enter the mouth, its fellow being seen on the other side of the splint. E, screw opposite lower canine tooth, head of the left screw being just discernable. E, head of screw opposite upper first molar tooth, end of its fellow being seen on the other side.*

like No. 1, holds the fragments of the jaw by means of the teeth only, without any bandage; and while the patients wear this splint they may follow, as with No. 1, their usual occupations.

Of my splint, No. 3, you say: "A third splint of Dr. Gunning's, one which he uses in cases where the teeth have been lost, is formed by connecting steel branches with the interdental part of the apparatus, of which the upper branch passes along the superior part of the face, and the lower one along the outside of the lower jaw; these are kept in place by three bands, one being placed at the chin in order to hold the jaw up in the splint, one running from the metal band to the back of the neck, and one passing to a cap which is worn over the head, and with which the splint is connected."

Gunning's Interdental Splint.

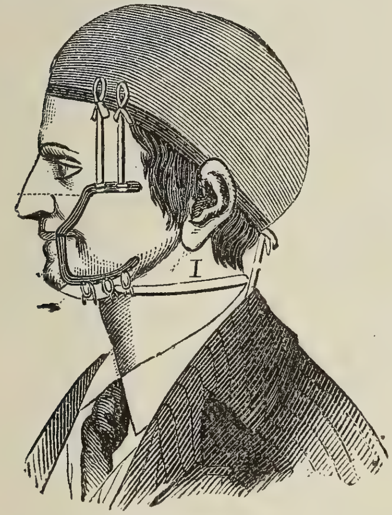

Fig. 644.

This is my plate 3, with its reference letters cut away, and your description leads the reader to suppose that a band of *metal* goes under the chin to hold the jaw up in the splint, and that metal bands are used instead of strings of tape to hold the splint by means of the cap and to keep a metal band from slipping over the chin. But no metal band is used anywhere nor spoken of by me. In the absence of teeth, the wings are used, two on each side, the upper range over the malar bones and the lower along the jaw; and from the cap on the head, tape strings pass down on each side to the upper wings and hold the splint against the upper gum, while the broken lower jaw is held up in the splint by a single thickness of linen or other thin material, which extends across under the chin from one lower wing to the other, while the lips, cheeks and all the face are left free from pressure.

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*This figure 2 was left out in the letter sent to Professor Agnew, but it is here shown in order that the reader may compare it with Dr. Agnew's figure 643, which is the same cut with the letters erased.

This statement would place the splint plainly before your readers, and give them the use of it, for their patients, when they needed or preferred it. This description is also briefer than your deceptive text. Certainly this splint, No. 3 (your figure, 644), deserves fair notice, it having been successfully used on the bad fractures of the Hon. Wm. H. Seward subsequent to the attempt to assassinate him.

Surgeon General Barnes and Surgeon Basil Norris, of the army, together with Dr. Whelan, chief of the medical bureau of the navy, and others, had signally failed to secure by ligatures and bandages the fractures received in falling from his carriage, before the Secretary was cut so terribly on the night that President Lincoln was killed.

Further, I did not take charge of the case nor set the fractures until twenty-five days after the accident, fifteen after the attempt to kill him; yet this splint with upper wings held the double and compound fractures of the jaw securely for sixty-eight days without a moment's intermission.

I described this splint, No. 3, to the New York Academy of Medicine, June 1, 1864, but the upper wings were never used until I applied them, May 2, 1865, in Mr. Seward's case.

Since then a severe fracture without a tooth in the mouth has been successfully treated, in which both upper and also the lower wings were used. It was applied in May, 1879, to the jaw of a farmer, seventy years old, with such good result, by Dr. Adams Bishop, reported in *Johnston's Dental Miscellany*, Vol. VII., page 63, and in the *Independent Practitioner*, Vol. II., page 108. Thus the splint, No. 3, has been fully tested, for this patient's fracture could not be held by the bandages used by the physicians who first attended the case. I devised this splint for fractures without teeth to hold by, and it has proved to be a perfect control for such cases; for the Secretary of State attended to the duties of his office while wearing it, and the farmer walked around at once, and followed his plough and did heavy work before his splint was left off, although he wore it only six weeks.

The deception of your text in regard to my treatment of these injuries is made complete by leaving out my splint, No. 4, here shown.

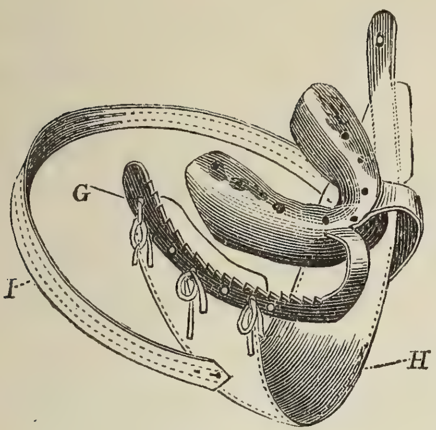

Fig. 4.

This splint, made of tin, and applied to the teeth of the fractured jaw by means of a lining of gutta-percha, or of plaster of Paris, was devised in 1863 for hospital use and for practitioners out of the reach of a dentist. It is cast with a handle in front, so that it is an impression cup such as dentists use, but when applied as a splint, the handle is cut off, and, if needed, wings are soldered on, and from these, when the splint is worn, a single thickness of roller passes under the jaw from one wing to the other.

I reported this splint to the New York Academy of Medicine, June 1, 1864, in answer to their request and letter of thanks in 1863. Within the week after reading the paper, I applied this splint, No. 4, to the jaw of a boy under Dr. Freeman's treatment, and in July I used the *same* splint with a new lining on the jaw of a boy sent to me by Dr. King. The indentations shown in the cut represent those made by the upper teeth of both boys when eating.

These splints, Nos. 1, 2, 3, 4, with cases to explain and illustrate the treatment, are clearly shown in my paper on the Treatment of Fractures of the Lower Jaw by Interdental Splints, first published in full in the *New York Medical Journal*, in 1866; they are also distinctly and fairly shown in every edition of that unique work, Injuries and Diseases of the Jaws, by Christopher Heath, F. R. C. S., published by John Churchill & Son, London, and by Lindsay & Blakiston, Philadelphia. (This work is the Jacksonian Prize Essay of the Royal College of Surgeons of England for 1867.)

The splints are also described at length and favorably noticed in the Report of the Judges of Group XXIV. on Medicine, Surgery, and Prothesis, transmitted by the Secretary, J. H. Thomson, A. M., M. D., to Prof. Francis A. Walker, Chief of the Bureau of Awards, and edited by him for the U. S. Centennial Commission, and issued by your own Publishers, J. B. Lippincott & Co., Philadelphia, before your work, "The Principles and Practice of Surgery." In all these publications the splints are explained and illustrated by the same plates used in your articles upon "Fractures of the Lower Maxilla." But your book shows my plates with the reference letters cut away, except to the holes for syringing, and states that the splints are held in place by securing the jaws together with a bandage. Whereas, my interdental splints were expressly devised to obviate the use of these bandages, which are cumbersome, unreliable and often destructive. These splints are not, as you intimate, merely supplemental; each one is a complete and reliable support.

The first is for all injuries in which the fractured jaw is allowed in my methods to move naturally while under treatment, and by far the larger proportion of fractures can be thus treated.

The second splint is for fractures in which the broken jaw is held in fixed relation to the upper one; and in some of these cases this splint does not cover the front teeth, so that, when worn, it is unseen.

All the splints have small openings to allow observation of the teeth which are near the fractures, so that the position of the broken ends of the bone can be learned at any time without removing the splint; and in fractures in which the lower jaw is held in fixed relation to the upper one, the splint has channels for the saliva from the parotid glands to pass in around the tongue.

You leave these important devices unnoticed, and cut away the letters of reference, yet, in the text given (say seven lines) to my splints, 1 and 2, you twice remark upon keeping the splint clean, and twice say or suggest that they cover all the teeth of the lower jaw, and then leave your readers ignorant and misled in respect to the radical features of the splints. But, in less than the room given to the repetition, you could have told that these splints hold the fragments of the bone in place securely, without anything outside the mouth; are quite comfortable, and the patients attend to their business and move about as when their jaws are sound. They do this even when the fractures are so severe that the jaw is held in fixed relation to the upper teeth, for in such cases the opening in front affords room through which to speak and receive food. But in most fractures, as before stated, the jaw is allowed to move, and the top of the splint is used in eating.

The eight cases in my paper which show the complete control attained by means of these splints were carefully selected; and with the four cuts spoken of in this letter, place my treatment, shown fully in 1866, at the service of all. Mr. Christopher Heath quotes from the *New York Medical Journal* and the *British Journal of Dental Science*, 1866, and his book shows my treatment clearly. In its appendix, case six, is my report verbatim of the Hon. Wm. H. Seward's case.

The official report of the United States Centennial Commission closes, in respect to my treatment of fractures of the maxillæ, as follows:

"In connection with the splints shown, was a series of casts illustrating the double-compound fracture of the jaw of the late Hon. William H. Seward, showing the jaw broken on both sides between the bicuspid teeth. Also a double cast of the upper and lower jaw as held by the splint for sixty-eight days. As no teeth were left in the upper jaw, the wings and cap were used, as shown in Fig. 3. The result was thoroughly satisfactory."

The Secretary, Dr. J. Henry Thompson, who transmitted this report of the Judges of Group XXIV., was a resident of Washington, where I treated the Secretary of State.

In addition to all this, your own city, Philadelphia, has in one of its prominent men a proof of the superiority of my treatment by splint over that by bandage, as used by Professor Buckingham of the Medical School of Harvard University. The fracture was received in the terrible stage accident in the White Mountains, in 1873, and the jaw, when the patient was brought to me, was so deformed that I had to break it apart. The splint was shown in the Centennial Exhibition of 1876, and the case is fully reported in the *Independent Practitioner*, Vol. I., page 526.

I have said that you leave out my splint 4; but, worse still, you place next after my Fig. 3 a splint which you show as Kingsley's, preceded by a description which ends as follows: "When applied, the teeth occupy the cavities in the splint, the latter being kept in position by a strip of roller passing beneath the chin from one arm of the apparatus to the other."

Now this method, the splint and the wings (arms) were devised by me. The splint, with its wings, was shown on the patient to the New York Academy of Medicine, October 21, 1863. It was for showing this apparatus that the Academy passed the resolution thanking me, and requesting me to report further; and, in response to which, I read the paper, June 1, 1864, which explained my four splints. See Bulletin, Vol. II., pages 153, 168, 307.

Kingsley does not use the splint nor the roller, as you say, but applies a sub-mental splint or compress, which is by means of some apparatus or band kept in connection with the interdental splint, the broken jaw being between them, and he maintains that this is necessary. But for fracture at the angle of the jaw, or in the parts above, he says that an interdental splint is useless, and that a bandage is indicated; that is, a bandage around the jaw and head. Thus Kingsley uses appliances external to the mouth in all cases, although my interdental splint, which, by enclosing all the lower back teeth, holds in the angles of the jaw has been in use since February 12, 1861, his treatment of fractures of the jaw is no improvement upon that of twenty-five years ago. In fact, he advises for fracture in front of the jaw, that which is inferior to Hayward's plan of 1858, in which a metal cap was fitted to several teeth on each side of the fracture, and from the upper surface of the cap a stout wire went out of each corner of the mouth to a gutta-percha splint under the chin, and from beneath this a four-tailed bandage passed behind and over the head; thus the lower tails passed outside the angles, which could therefore be held in with pads. Whereas, Kingsley says: "If the fracture is in front, the splint need not cover all the back teeth; but if it be at the side, it is better to cover all the teeth of that side. It is also better to set the ends of the upper and lower jaws in an articulator, and thus make prints of the upper teeth in the wax, to be retained in the splint." But with the splint so cut off as not to enclose the back teeth, the angles will be forced out by the muscular traction on the inside of the chin, for the outside wings cannot be used beyond the ends of the splint, as they would lift it up from the front teeth. In fact, the muscular traction on the inside of the chin might alone wring the fractured ends out of the splint by forcing the latter up the outer surfaces of the canine or bicuspid teeth. Again, if the splint only covered the teeth on the fractured side, then those of the other would have no bearing, and no eating could be done except on the splint over the fracture; and if the patient should happen to use the uncovered teeth on a large morsel, it might force the fractured ends apart, whether they were in the side or in the front of the jaw. Dr. Kingsley's examples of the application of this splint to double or triple fractures are quite as bad as his advice in regard to single fractures. All he shows of importance, was first devised, used and published by others before him; it is, as told by him, of little service to the reader, because of its intermixture with statements which are not in accord with the facts of history nor of science.

Yet your text is such as leads the reader to adopt his treatment and reject my methods—this, not because of any want of clearness in my description, for you could have quoted from my paper in the *New York Medical Journal*, Vol. III., page 434: "When a well-adapted splint is on the teeth and gum, the other parts around the bone are, to a great extent, a counter-support to the splint . . . . Meanwhile, the motions of the jaw are in most cases unrestricted, and the cheeks and lips always left free." Ibid, 442, "Fig. 1, is the representative splint for treatment of cases in the first class or those in which the jaw is left free. Fig. 2, for the second class, or those in which the jaw is held still."

Yet, with this plainly stated, you class these splints together, and say: "This splint, when placed in position, forms a cap, and is kept in place by securing the jaws together with a bandage, or by means of screws passed between the teeth." Your text, on page 847, confirms this, as follows: "The splint of Dr. Bean resembles closely that of Dr. Gunning." . . . "The splint, when applied, is kept in position by straps which pass over and around the head, and also behind the neck." Your text again misleads the student, for you admit that Bean's splint "is fitted to the teeth of both the upper and lower maxilla," in which cases my splint is screwed to the teeth, and while I use nothing outside the mouth, you lead the reader to suppose that I use a bandage around the jaw and head, and you do this, although my treatment of fractures, with the splint illustrated by Fig. 2 (your Fig. 643) is related in the *New York Medical Journal*, Vol. IV., page 16. In case five it is distinctly shown that the surgeon in Bellevue hospital who had charge of the woman, tried to hold the jaw up in the splint with Hamilton's bandage, but on the third day he requested me to screw the splint fast to the teeth, as the bandage was painful and useless. The splint was screwed to the teeth, and the jaw united in forty days.

In January, 1861, Dr. Benjamin Franklin Bache, U. S. Navy, advised that I should be asked to treat a Spanish seaman, whose fractured jaw was found to be incurable at the Naval hospital, N. Y. Howard Hayward's method of treating these injuries was then the most advanced, and although it was very imperfect, did much to prepare the minds of surgeons to accept the co-operation of dentists, at least in Great Britain. After study of the literature of the subject, say as given for twenty-three centuries back, and then making careful allowance for the muscular action involved, I devised the splints and methods of applying them, which were fully published; and the correct action of the muscles which control the jaw was shown to guide the surgeon. This was necessary, as I demonstrated that the *external pterygoid* muscles depressed the jaw and opened the mouth, instead of the *digastrics*, as maintained by Hunter. I also explained that the lower jaw is the lever by which the head is held forward, so that, when the jaw is broken, it requires firmer control than can be given by appliances which rest upon the soft parts external to the mouth. In the years which have since passed, my experience has suggested nothing which I think necessary to perfect my treatment of fractures of the maxillæ.

You however do not show my splints and methods *fairly*, in order that your readers may contrast my plans with others, and judge of their relative merits, as the student is led to believe by your preface.

I trust that you have been yourself imposed upon, and that you will now and in the future, as far as possible, correct the wrong which has at present the sanction of your name. I am, Sir,

Yours respectfully,

THOS. BRIAN GUNNING.

Philadelphia, 1611 Chestnut Street,
December 1, 1883.

DR. THOMAS BRIAN GUNNING.

Dear Dr.: I am indebted to you for an accurate description of your interdental splints for fracture of the jaw, and shall with great pleasure make the correction in the next edition of my book, should it reach a second edition.

Very truly yours, etc.,

D. HAYES AGNEW.

WHAT VULCANIZED RUBBER DOES.

BY L. P. HASKELL, CHICAGO, ILL.

In the March number the "old story" comes up again, but I notice your correspondent is not on the right track.

Now while there is "mercurial poisoning" from vulcanite plates, which I can demonstrate beyond all peradventure, that is comparatively rare; but the main evil arises from their *non-conductibility*, so that the retention of the heat under the plate constantly inflames the membrane, and not only produces a very uncomfortable feeling in many mouths, but produces most serious results in the undue absorption of the alveolar process, to such an extent that thousands of mouths are ruined for plates, there being nothing left but a flexible ridge of thickened membrane.

If the suction is poor, or the plate is being constantly loosened by a faulty articulation, so that the air circulates under it to some extent, the effect is not so rapid.

Six years ago I visited Boston, where I previously practiced, spending two months, and took occasion to examine the mouths of quite a number of my former patients, whom I had not seen for more than twenty years, and who were wearing plates of gold or platina made by me twenty to twenty-four years previous, and in every instance their gums were in perfect condition, hard and healthy, showing no signs of undue absorption, lower as well as upper.

I was surprised, for all these years, since the introduction of rubber, I had so constantly witnessed its bad effect, in the shape of inflamed, spongy, unduly absorbed gums, I had come to regard it an every-day affair, although in my present practice the mouths wearing metal plates are constantly bearing the same testimony as in the Boston cases. Nearly forty years' exclusive practice in mechanical dentistry has given me abundant opportunity to establish the truth of this theory, which was first brought to the attention of the profession by Dr. W. B. Roberts, of New York, more than twenty years ago, in an article written for the "*People's Dental Journal*," published by myself, in which he uses the following language:

"These effects, as noted in our own experience, and declared by the evidence of many others, were, first, *a great absorption of the alveolar and bony substance of the jaw;* next, irritation of the mucous membrane, and a *condition nearly approaching salivation;* then gastric irritation, and finally, the general derangement of the health consequent upon such abnormal conditions.

All these symptoms of disease were removed by simply removing their obvious cause, RED VULCANITE; while a healthy condition continued after replacing it with gold, or continuous gums.

One cause of these inflammatory conditions under red, or any color of vulcanite, is the fact that it is a non-conductor of heat, and this cause, as will be apparent to any physiologist, is sufficient to produce the worst results."

I would add, further, that the same results follow the use of celluloid. Such being the facts, what is the duty of the dentist to his patient when being consulted as to what is the best material for plates? To let him remain ignorant of these things, and suffer the results as thousands are doing, or to advise the use of a metal plate? To be sure, there are many who can afford nothing but the rubber, but give all a chance to choose.

WHICH WAS FIRST, THE HEN OR THE EGG? THE "BUG" OR THE ACID?

BY F. Y. CLARK, M. D., D. D. S., 35 W. 35TH STREET, NEW YORK.

Which was first, the hen or the egg? is still a mooted question; and so we may now say of the "bug" and the acid; for it would seem, from Dr. Miller's last modification of views, that investigation as to the real cause of dental caries has culminated in this one question.

Over twenty years ago we became quite satisfied that caries was not caused by fluids of the mouth, but by septic factors generated in pits, fissures and all inaccessible places where particles of food can lodge and remain unmolested. After long years of investigation, contradiction, and no little abuse, it affords us considerable pleasure to—without the fear of contradictory proof—repeat what we have written and asserted in various papers and on various occasions: *That carious tooth structure is brought about by organic factors, inaugurated by air germs through fermentation. That in all pits, fissures, abraded, defective, hidden, and all inaccessible places in and about the teeth where particles of food or foreign matter are lodged, and remains unmolested, fermentation sets in and organism follows organism, absorbing the bioplasm in the canaliculi, leaving the limey substance to disintegrate. The change of shade is caused by the pigment in the protoplasm of bacteria which is light yellow, brown or dark, according to organic advancement.*

By carefully looking over Dr. Miller's last paper, and comparing it with his preceding papers, we find his investigations lead to the same view, with the exception that he contends that the *fungi* produce—or through fermentation manufacture—an acid which they send ahead to break down the mesh walls of the dentine and thus prepare the way for their entrance.

In a former paper, he says: "Enormous masses of fungi, leptothrix threads, bacilli, micrococci, etc., work their way into the deeper parts of the softened dentine, stop up the dentinal tubuli, or destroy the dentinal fibrils. The outer layers of dentine consequently receive no further nourishment, lose all vitality and fall a prey to *putrefaction*." In another place of the same paper, he adds: "The masses of micrococci and bacilli which penetrate the dentine, stop up the tubules and must lead, sooner or later to the death and destruction of the dentinal fibrils, in consequence of which the outer layers of the dentine lose their nutritive connection with the pulp and die from lack of nourishment."

Now it seems to us rather strange that Dr. Miller, so apparently particular in many other respects, should so unwittingly lose sight of one of the most important of all functions pertaining to these organisms. He is most certainly aware that they exist at the expense of the substance in which they are found; and as they cannot subsist on, or absorb, the lime-salts, and are, as he says, away on beyond the zone of decay, by what means, then, do they subsist and increase? As we have said before, they absorb the bioplasm in the tubules and through this nourishment exist and increase; for, according to Pasteur and all high authority, "*fermentation is a change of chemical composition in organic compounds brought about by a certain class of plants or organisms which, deprived of drawing the essential element of their composition from the air, propagate themselves in the very substance of organic matter of all kinds by the breaking up of these matters and appropriating such elements as are necessary to their own growth.*" If Dr. Miller's theory as to the action of *fungi* on the teeth is correct, it must hold good in other parts of the system. We would have to say bacillus anthracis of splenic fever destroys vital tissue by an acid instead of choking up and converting life-plasm into their own species. And so of micrococcus vaccinialis—small-pox bacterium—micrococcus diphthericus—diphtheric bacterium—micrococcus septicus—pyæmic bacterium—of Koch's bacillus tuberculosis and so on through the whole list of germ contagion. This would upset the investigations of Pasteur, Cohn, Koch, and all other co-workers in microscopic science. According to their writings, and the experiments of Buehl, Hunter and Ortel, made by some as early as 1871, bacteria of the micrococci and bacilli species destroy all tissues and muscular fibers around which they intwine and propagate by appropriating the life substance of such tissues and fibers for the rapid propagation of their own species, and by this rapid increase fill the capillaries, arrest circulation and produce death. Evidence in support of this view has accumulated and become indisputable. To accept the theory of Dr. Miller we must decide this to be all wrong; for what holds good in the life history and behavior of any one species of these organisms in one instance, under similar conditions, holds good in another.

"The outer layers of dentine lose their nutritive connection with the pulp, die from lack of nourishment and fall a prey to putrefaction."

How about pulpless teeth with filled roots? Do they fall a prey to putrefaction? Their nutritive connection with the pulp is severed, yet they do good service and last indefinitely.

We are not willing to say these organisms enter sound enamel directly. What we wish to convey is: *that they make their entry from abraded or defective parts,* and it is even reasonable to suppose that through fermentation, in many protected localities, they may produce an acid sufficient to dissolve enough lime-salts from the enamel to open the way; but to assert that they, when strung along in chain-like rows in the canaliculi of the dentine, destroy and decompose this tissue by an acid, is contrary to fact and evidence. But even admitting this—the mooted question—we of the germ theory are still right, for the *germs are first* and the acid second. *Without the germs,* there would be no *acid;* and without the acid, *no caries.*

In order to detect the supposed acid beyond the zone of decay we, with others, have, from time to time, within the last year, made over fifty microscopical examinations of such dentine, taken from teeth in the mouth, and have failed in every instance to detect anything like an acid. A careful and patient microscopical study of acids under two or three powers, ranging from a one-fourth to a Toles' one-sixth, or a Spencer's one-tenth, with B or C oculars and good light, will soon enable one to detect the minutest trace of acid in the saliva or dentine. We know from our own investigation that this is a surer and much more reliable way than litmus paper, for, in many cases, we have detected acids in this way when litmus paper failed to reveal them.

In the August number, 1883, page 232 of this journal, Dr. Miller says: "As a summing up of what has been said, I will state that from careful study of over one hundred and fifty preparations, I am driven to the conclusion that there is as yet no sufficient ground for the assumption that micro-organisms play any more than an *unimportant* part in the caries of enamel." *How can this be if, as now admitted, the bacteria, through fermentation, produce the acid?* If the acid is produced by fermentation, through the activity—or by means of—bacteria, how then does the bacteria *play a subordinate part?* The so-called "*fungi**" in the first stages, he says, "is not observable." Why? Because, in all incipient stages, before these organisms enter the enamel, they are frequently washed away and have to make many successive attacks, involving months and frequently years, before they secure an unmolested lodging. Therefore, the enamel may be abraded *without the true factors being observable.* Again, we must bear in mind the low organic nature of the enamel as compared with the dentine. There is *little or no nourishment* there to invite the stay of these organisms, therefore they pass on into the tubules of the dentine in search of richer food and, as Dr. M. says, *"are not observable."*

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*We don't believe this word is strictly applicable to the micro-organisms under consideration. Cohn, who has given us the most acceptable classification, says: "There is no relation between bacteria and mold fungi. When I commenced these observations, I made it a main object to find out whether bacteria come from germs *sui generis* or are developed from other fungi. The results are in refutation of the latter view. I have made hundreds of observations, and they show me that bacteria will only bring bacteria, and mold fungi only mold fungi."

As stated, it is quite common to see the dentine powdered, or so that it can be removed in layers, leaving the enamel entirely intact, excepting the aperture of entry. How is this? Has the acid greater affinity for the *dentine* than for the *enamel?* When we compare the analysis of the two, *we see the reverse is the case;* and yet the *factor seeks the dentine and not the enamel.* Again, the lime-salts of the dentine are not dissolved, but disintegrated, and can, by careful manipulation, as Dr. M. states, be found in a powdered condition, which is accounted for by the mesh-work or bond of union being *removed or absorbed* by micro-organisms. If the dentine was dissolved by acids, it seems to us it would not be seen in *powder or layers;* nothing but the organic tissue would be left.

In speaking of advanced caries of dentine, Dr. M. says: "The outer layers deprived of nourishment die and fall a prey to *putrefactive agents,*" but in all his papers he has been *singularly reticent* as to what these agents are. How can organic putrefaction take place without *bacteria termo?* And yet we understand him to say that this organism is not found in carious dentine. Then, according to Pasteur, Cohn and my own observations, putrefaction of carious dentine *can never take place.* We do not claim that our knowledge of bacteria and microscopy, or that our facilities for investigation are as good as Dr. M.'s, but if he ever comes to America we will take pleasure in showing him bacteria termo (according to the plates of Cohn) in carious dentine.

Considerable importance, judging from the last of the sentence, is put on the following quotation from Dr. Miller's Springfield paper: "A question in practice is suggested by the following case. A patient comes with a tooth containing a large amalgam or gold filling, made five or ten years ago. The filling was inserted over a living pulp, which afterward died; or, as frequently happens in Germany, over a dead pulp. An abscess followed and a fistula was formed which has been active at intervals throughout the whole period of ten or more years. During all this time there was probably not a moment when a microscopic examination of the contents of the root canals would not have revealed great numbers of fungi under conditions of moisture and temperature very favorable to their development. When, therefore, we remove the filling and find no signs of caries in the root, we wonder what those organisms have been doing all these years."

This is rather an isolated and exaggerated case. But it proves as much one way as the other—perhaps a *little more for the germs* than for the acid. If an amalgam filling, the *mercury* in the amalgam acted as an *antiseptic* and the crown was kept comparatively free of *septic action.* But in reality, after the death of the pulp and all the nutriment in the mesh tubes of the dentine was absorbed or exhausted, there was *nothing more in the tooth to sustain life.* They could not subsist on the *lime-salts,* therefore they drew their supply of nourishishment from above or below through the foramen. In such cases the framework of the tooth remains indefinitely, according to *many conditions.* But what, let us ask, becomes of the *acid* produced by the "*great numbers of fungi,*" that are said to be in the root-canals of such teeth? for, according to Dr. Miller's theory, there ought to be an *immense factory* of acids in all such cases. If *one little micrococcus can manufacture sufficient acid to open up his way through sound dentine, is it not reasonable to argue that large numbers can manufacture enough within ten years to decompose the dentine in one dead tooth?* Yes, if, as asserted, *one little micrococcus or bacillus can* PRODUCE ACID *enough to cut his way through sound tooth structure*, then it must follow, as the "night the day," *large numbers*, as in the case quoted, *ought to produce acid enough*, *according to the same theory*, *to decompose or dissolve the dentine in the canals of one dead tooth inside of five or ten years.* If they cannot, then, in Dr. M.'s language, we say, "*evidently there is a limit,*" *and we may say with confidence*, *acids thus produced are not sufficient to destroy dead teeth.*

But, seriously, were it not for encumbering this paper, we could cite many similar cases occurring in every-day practice, proving, almost beyond contradiction, that bacteria play the *most important part* in the decay of the teeth. If, as Dr. M. says in his last paper, they belong to an organic ferment, *which we have always claimed,* and this ferment produces an acid which acts on the teeth, then, as said before, the germs are *most important and first; without them*, *there would be no acid; and no acid*, *no caries.*

Dr. Miller says in his last paper, found in the March number of this journal, that: "Exp. 1. Fresh saliva is mixed with sugar or starch, one to forty, and kept at blood temperature. It invariably becomes acid in four to five hours. But *some one*, no doubt, will say this is a result of *no consequence*, because the experiment was not made within the oral cavity. For his personal benefit we give the following."

As to the first sentence of this experiment, we would say that any one at all familiar with the first laws of fermentation must know that the same thing will occur under all and similar circumstances with any and all liquids containing nourishment for organic life. But does this occur with the saliva within the oral cavity? Yes, if the *supply from the ducts is stopped*, that which is left will turn sour, but not enough to *corrode the enamel.* This, however, never takes place in the mouth. There is a constant flow of neutral saliva from the ducts, consequently no time for such fermentation; therefore, we agree with Dr. M. in his assertion that "*some one will say this is of no consequence*," for we can honestly say it is not of the *least* consequence.

Exp. 2. A glass tube, two c. m. long and three m. m. wide, is filled with starch, *sterilized*, and fastened to a molar tooth in the mouth on going to bed; next morning the contents of the tube will have a strong acid reaction," etc. We are at a loss to understand this—"A glass tube filled with starch, *sterilized*." Is not this an error? Should it not include saliva? But even so, how could fermentation and strong acid reaction set in if *sterilized?* By sterilization *all organic ferment* will be destroyed and, consequently, no change should have occurred. Any liquid, *sterilized*, and closed hermetically, free of air germs, should remain so indefinitely, as is proven by

"Exp. 3. The mixture of saliva with starch or sugar is kept for a half-hour in the *sterilizer* at one hundred degrees centigrade, and then placed in the incubator; it does not become sour in four nor in twenty-four hours; in fact, *not at all*."

"Exp. 4. The starch is heated to one hundred and fifty degrees centigrade before mixing with the saliva; the solution still becomes sour," etc. Now, how is this? If the starch was *sterilized* as stated in Exp. 2, and becomes sour in the mouth, why did it not also become sour in Exp. 4? Both, as stated, were *sterilized*, and one *became sour and the other not*. We know of no two degrees of sterilization.

If normal saliva is sufficiently acid to account for incipient caries, then this acidity must be brought about through fermentation in the oral cavity, or before the saliva leaves the glands. In abnormal conditions we know this is so; but in health the saliva is nearly always found neutral or slightly alkaline. How, then, do we find teeth subjected to the last condition affected with caries? It will not do to say, because the saliva can be fermented, as in Exps. 1 and 2, that it can dissolve tooth structure; for such conditions are never found in mouths excepting in carious teeth and unmolested localities, where fermentation is unmolested. We admit that in abnormal conditions of the system the saliva is nearly always strongly acid or alkaline, especially in all diseases of the stomach and bowels, and where there is inflammation of the alimentary canal; but in health, and commonly where caries is making rapid progress, as said before, it is neutral, or sufficiently near, to preclude the possibility of action on the enamel. The saliva in health and out of health is so different, and subject to such changes or variations, that it would be very unfair to say that because it can be fermented and made sour or acid, this is the natural condition. This, according to dental chemistry, and our own observation, is generally the extreme abnormal condition. If we want acid, alkaline, milky, bloody, fetid, saline, and many other varieties, they can all be collected from the mouth in certain diseased conditions of the system.

As to color-blindness we are informed by reliable optical authority that those who are most positive as to their correctness of color vision are generally the ones most afflicted. But this is not the worst blindness poor humanity is heir to. Early teaching, professional prejudice, eclat, favor and reward, etc., too often blind our eyes and prevent honest investigation; for, disguise it as we may, these *scales*, like the cork on a fish-line, bob up and down at the least ripple of favor or reward, and thus our eyes are blinded and minds perverted. To be true and honest investigators, we must first free ourselves as far as possible of early predilection and of all and everything calculated to bias honest work, and, like conscientious jurors, have our verdict according to fact and evidence.

In conclusion, we think it safe to say that bacterial factors play the *most important role* in the production of caries; this is fully proven by *antiseptic treatment.* No mite of animal or vegetable matter in or about the teeth can undergo fermentation so as to introduce organic action sufficient to act on the enamel within eight or ten hours; therefore, if every attempt at fermentation within the mouth is broken up by carbolic acid or some similar antiseptic wash within the time stated, it must follow that no fermentation can take place and the end is *no fermentation, no "bugs,"—no "bugs," no acid.*

We once knew a little bad boy who was in the habit of teasing a faithful neighboring watch dog by poking him with a long stick. The dog would growl and bite the end of the stick, which was fun to the boy. But one day the dog reasoned the thing over and went for the *boy;* the boy went for home with defective pants and the dog was poked no more. Now if the "bugs," as Dr. M. says, poke their acid up the tubules we had better go for the "bugs" as the dog did for the boy. Going for the acid like going for the stick has been tried, and is nothing but fun to the "bugs." As the "bugs" produce and use the acid, they are the head devils in the fight. Therefore, if we use reason and go for them with proper antiseptics we may not get their pants or "catch" them, as Dr. Watt says Dr. Miller has, by the "tail," but, better still, by heroic action annihilate the whole tribe.

EDITORIAL.

PROF. GORGAS' DENTAL MEDICINE.

The *Dental Cosmos* of March, 1884, contains a notice by "A. W. H." of Prof. Gorgas' late work, "Dental medicine," not in harmony with the high commendations it has received from other dental journals both in this country and in Europe. Its object seems to be "To damn with faint praise," or rather with alternate approval and criticism, so that the latter shall neutralize the former.

The article says: "The work contains a large amount of useful information which is not to be found in any other one volume, but we think a different disposition of the material could have been made, which would have made it more convenient for reference."

The critic is down upon the chapter, "Important Points in Diagnosing Affections of the Mouth" in this wise: "This is wanting in accuracy and incomplete in detail—as, for instance, the portions which refer to inflammation of the dental periosteum and alveolar abscess." Why did he not *show* the inaccuracy, and not merely assert it? Of the description of pyorrhea alveolaris, where Dr. Gorgas says there is "a recession of gums and absorption of alveolar process, a tendency to hemorrhage," etc., the critic says: "The facts are quite generally the contrary." Then, as if conscious that he had rendered himself liable to the charge, says: "These comments are made not in a hyper-critical spirit, but in the interests of scientific accuracy."

Scientific accuracy, indeed! that pyorrhea alveolaris is not characterized by "recession of gums and absorption of alveolar processes, a tendency to hemorrhage," etc. Can it be that "A. W. H." has ever seen pyorrhea alveolaris in all its stages?

But, again, he says: "We think the author, in the endeavor to present a large amount of matter in limited space, has sacrificed clearness of description and accuracy of detail," and then complains that no mention is made of twenty or more agents whose merits as dental medicines are yet in doubt. Other criticisms are so indefinite that they admit of no answer—such as "We hope that in future editions the author will omit much of the extraneous matter with which the book is encumbered," etc.

On first reading the article, we thought it an attempt at scientific "buncombe" rather than candid criticism. As a whole, the criticisms are either frivolous or incorrect, and nearly all of them seem hyper-critical and unkind in spirit.

The work will survive.

CARBOLIC ACID IN THE TREATMENT OF DIPHTHERIA.

Dr. Götz recommends as a safe treatment of diphtheria the injection of carbolic acid into the affected glands and the parenchyma around them. He observed that the diphtheretic membrane easily died after a short time, and even if it should creep from the glands into the soft palate, it is rarely very intense. It is as if the poison had been deprived of its active vitality. The injection into the tonsils he used in quite a number of cases. Of sixty-four cases, he treated half with injections and half without. Of those treated with injections, not one died; while of the others, 11 per cent. died. Though the whole number of cases thus treated is not yet very large, it would be worth giving the remedy a good trial in this scourge; the treatment appears very rational and easy.

FAT AS AN ANTI-FAT.

Dr. Demuth, of Germany, has made extensive experiment in reducing fatness with a treatment of fat, and he comes to the conclusion that fat is not such a bad drug for great fatness.

We have several letters from a prominent gentleman in the profession who is interested in the question—now uppermost in the minds of the best informed dentists—of antiseptics, and they so clearly state the real issue involved that we venture to quote a portion of them.

"I am glad you are keeping the antiseptic question going. It may result in getting something that is effectual and that dentists can use. For a dentist's use an antiseptic must be a 'dead shot.' Nothing that simply arrests, retards or anæsthetizes the 'bug' is of the least use. It is a deception and a snare, deceiving the patient into the idea that he is having something done, and the operator that he is doing something. The bichloride of mercury seems so far to come the nearest to our aim, though if the fools catch the idea that it is a salt of mercury we shall have another vulcanite and amalgam scare." . . .

"It seems to me that what we want of an antiseptic is not in cavities that we are about to fill—for the very stopping out of moisture and air destroys the germ life—but in the open mouth to arrest decay and to cure 'Riggs' disease' in its incipiency; something that the patient should take with his daily ablutions as a daily safeguard. When caries has begun, it is n't going to do any good for the patient to come to the dentist once in six months, for the disease will continue in spite of any and all such care. The patient must have it in his power to arrest, when begun, and to prevent, when free from, caries. And so with 'Riggs' disease.' If bacteria have a part in this, as no doubt they do, it is only by constant daily applications that they are to be kept away, and, when the dentist has done faithfully his part, prevented from recurring. This must be done by the patient himself; the dentist is helpless."

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An October number, 1881, of *Johnston's Dental Miscellany* wanted. Please correspond with the editor of this journal.

Owing to the activity of our contributors, we are obliged to let much editorial matter go over to future numbers.

A dental practice for sale. See advertising pages.

TRANSLATIONS.

SUBSTITUTES FOR LOST JAWS.

BY DR. W. KAY OF BERLIN, PRUSSIA.

[Translated from the Zahntechnische Reform, Jan., 1884.]

Until recently, little has been known about substitutes for lost jaws, which may be easily explained by the rarity of the defect and the difficulty of supplying said appliances. A little more than a year ago, Dr. Dieffenbach, of Bonn, made such a substitute for a driver, but a description of it was not published. I myself had an opportunity to see the photographs of this case; the defect had arisen by the necessitated resection of the entire upper jaw, as far as the sockets of the eyes, in order to remove a fibrous tumor which had formed in the cavities of the nose and mouth. Another case, that of supplying a substitute for a lost lower jaw, has been recently dedescribed by a Mr. Sauer.

I have had, in the last few years, to furnish artificial substitutes for four cases where one-half of the upper jaw had been removed. There are various causes making resection of the jaws necessary; these I only incidentally enumerate, as they are of secondary importance to the dentist charged with making the artificial substitute. These causes are mainly syphilis, polipi in the nose or mouth, and necrosis. I shall not, therefore, enter into details concerning the origin of these four cases. The removal of the several bones and the cicatrization of the cut soft tissues naturally results in a very considerable disfiguration of the face. The soft tissues fall in; the face is distorted and crooked in consequence of the shortening of the muscles, and as the bone which separates nose, mouth and throat cavity no longer exists—the hole reaching up to the nasal canals—speech is impeded and swallowing made difficult, inasmuch as the food would come out through the nose. Such patients are naturally very wretched without artificial substitutes, and it should be the ambition and aim of every practical dentist to be also able to exercise his art in these special cases for the benefit of his unhappy fellow creatures. The most difficult matter in these cases is the obtaining of an exact impression. The mouth is generally, in consequence of the shortening and cicatrization of the muscles of the face, so contracted, and its opening so small, that *scarcely a teaspoon can be inserted.* But even if we *do* insert an impression cup, a second difficulty will present itself. In consequence of the great contraction, the lower and upper jaws can be but very slightly separated from each other; and, taking for granted that there are teeth on the non-resected side, it is evident that an ordinary impression cup cannot be inserted, and that a sufficient quantity of impression material cannot be carried in high enough to obtain an exact impression of the cavity caused by the removal of the upper jaw bone. In order to insert the impression material, therefore, it is necessary to leave that side of the cup which would otherwise press against the teeth without any edge whatever, so as to be able to pass by the teeth and go higher up. But even with this facilitation, we must abstain from applying wax or gutta-percha. As the removal of the impression is far more difficult than its insertion, we must, provided the substance be soft and yielding, be prepared to find it entirely out of shape, and we should also have a very imperfect impression of the teeth which are to serve as a support for the appliance, and whose very precise form we need. Should we, on the other hand, allow the substance used to become very hard, the danger would be great of not being able to remove it at all. In such cases, where the above-mentioned complications exist, we have no better material than plaster of Paris. It breaks on the outside of the teeth in removal, where it usually forms but a thin wall, and the parts can easily be attached in their several places by means of wax. In one case, however, even plaster could not be inserted, and I was obliged to sacrifice an incisor in order to obtain the requisite space. After having selected a suitable impression cup, and cut off the rim on the side where the teeth are, the other rim must be bent as much as possible outwardly in order thereby to secure an expansion of the buccal muscles, after which the desired quantity of plaster is inserted, taking care to pass beyond the teeth, so as to expand the mouth on the defective side. Should the contraction be so great as not to allow the desired quantity to be inserted at once, less must be used at first, and the rest carried in by the fingers, expanding thereby lips and cheeks as much as possible on the resected side. In like manner we proceed with the non-resected side where sufficient plaster is carried in by the fingers on both sides of the teeth in order to obtain an exact impression of them. When the plaster has hardened sufficiently, it will break off at the first attempt to loosen it, and the several pieces are carefully removed; while removing the buccal impression on the defective side, great care must be taken, turning and revolving as necessitated, in order to get beyond the teeth. The impression should always be taken as far back as the uvula. After putting the several pieces together, the model is cast. The purpose of the artificial substitute is not only that of being an obturator, i. e., closing the hole that leads to the nose, but also that of restoring the face to its natural form and shape, and a simple plate would therefore not suffice. It must also be adapted for mastication. The next step, for this reason, would be the taking the bite of the lower teeth. A strong plate of gutta-percha is put on the model and pressed into clasps which are fitted accurately to the teeth on the non-resected side, so that the proof-plate may have a support in the mouth. The cavity in the gutta-percha is evened up to the desired height with wax and allowed to harden ; then a small quantity of soft wax is added, until the under teeth, when biting against the upper ones, leave their prints on the wax on the resected side. Then the impression is taken from the under jaw, and, with the upper model, put in the articulator.

[To be continued.]

BOOKS AND PAMPHLETS.

DENTAL MEDICINE : A Manual of Dental Materia Medica and Theraputics for Students and Practitioners. By Ferdinand J. S. Gorgas.

This able work, by Prof. Gorgas, supplies a want long felt by the dental practitioner. It is to the dentist what the larger works of materia medica are to the physician. The wonder is that such a work, so complete and reliable, has not been published long ago. In addition to dental materia medica proper, it contains various tables, and a good deal of valuable matter conveniently arranged for reference. We cannot better give an idea of the plan and scope of the work than by quoting the "Table of Contents."

Preface : Introduction and Definitions and General Remarks—Action of Medicinal Substances—Important Points in Diagnosing Affections of the Mouth—Charateristic Indications of the Tongue—Abbreviations with Latin and English Terms—Approximate Measurements—Fineness of Powder—Weights and Measurers—Metric or French Decimal System of Weights and Measures—Rules for Regulating Doses—Table of Doses of all Officinal Medicines, Expressed in Terms of both the Apothecaries and the Decimal Metric System of Weights and Measures—Poisons, Symptoms and Antidotes—The Pulse—Pulsation per Minute at Various Ages—Respiration at Various Ages—Thermometers—Table of Elemetary Substances—Table of the Solubility of Chemicals in Water and Alcohol—Classification of Medicinal Substances—Definitions of the Various Classes of Medicinal Agents—Forms in which Medicinal Substances are Employed—Source, Derivation, Medical Properties and Action, and Therapeutic Uses of Medical Substances Employed in Dental Practice; Together with their Dental Uses and Application—Administration of General Anæsthetic Agents—The Dangers of Anæsthesia—Preventive Measures Against the Dangers of Anæsthesia—Treatment of Dangerous Symptoms of Anæsthesia—Methods of Resuscitation—Sylvester's Method—Hall's Ready Method—Local Anæsthesia—Topical Remedies—The Endermic Method—The Hypodermic Method—Setons and Issues—General Bloodletting—Local Bloodletting by Leeching—Cupping and Scarifications—Periods for the Eruption of the Teeth—Electricity as a Therapeutic Means in the Treatment of Disease.

In selecting nearly one hundred prophylactic and theraputic agents, the author has evidently taken great pains to give those whose value is well known, leaving the new and those yet undetermined still in the hands of the experimenter. More than two hundred and fifty dental formulas are given under the head of the principal ingredients composing them, thus making reference easy. We will not attempt to give all its good points. It is both an educator and an assistant in daily practice. No dentist can afford to be without it. It is a duty he owes himself and his patrons to own and consult it.

F. S.

A SYSTEM OF ORAL SURGERY: BEING A TREATISE ON THE DISEASES AND SURGERY OF THE MOUTH, JAWS, FACE, TEETH AND ASSOCIATE PARTS. By J. E. Garretson, M. D., D. D. S., Dean of the Phila. Dental College, Surgeon in charge of the Hospital of Oral Surgery, Member of the Phila. County Medical Society, Member of the Phila. Pathological Society, etc., etc. *Fourth edition. Thoroughly revised, with important additions.* 8vo. Published by J. B. Lippincott & Co., Phila.; London: 16 Southampton street, Strand. Cloth, $8. Sheep, $9.

It is not our present purpose to attempt a "review" of this most excellent work. Garretson's Oral Surgery is already too well and favorably known as authority throughout the dental world, and for its inestimable value to the profession, to render a simple review at all necessary, or even desirable. If we can assist in inducing every professional man to add a volume of it to his library, we shall enjoy the satisfaction of feeling that we have accomplished no small amount of good. Prof. Garretson has done everything within his power to make an absolutely reliable work; and that means a great deal. When an author, so accomplished and scholarly, can express himself as being even measurably satisfied with his work, having nothing more to add, the result must certainly be that which the rank and file of the profession will want to avail themselves of. We know of no work more essential to every practitioner. It is, in fact, of itself, a dental library, embracing almost every subject connected, directly or indirectly, with the practice of oral surgery. It is a volume of 1,002 pages, splendidly printed and bound, profusely illustrated by excellent steel plates and wood cuts—nine of the former and six hundred and sixteen of the latter; indexed by chapters, of which there are sixty-seven, and by general detailed subjects, comprising thirty-five double-column pages, besides seven double-column index pages of illustrations, making a volume of 1,060 pages.

"Exertion has increased to condense and simplify. Illustrations to the extent of seventy-five new cuts have been added. Every part of the volume has been rearranged, rewritten, or complemented.

The fact that this 'system' has come into common use by dental colleges makes desirable unexceptionable fullness in the direction of things considered by the specialty. Effort has been made to have no principles absent. Irrelevant matter is not present to perplex. The teachings and demonstrations being prepared specially for the guidance of students and practitioners of oral surgery, the author offers them as a result of thirty years of practice. Time has been taken for experimentation, for consideration and for execution. The responsibility has been continually in mind. The writer has done all he finds himself able to do."

Doubtless disagreement may exist in the minds of some of the co-laborers of Prof. Garretson relating to theories, as well as treatment and methods; but none will be more ready than such to join with the civilized world in according to him high honor for scientific attainment, honest and conscientious purpose, and as standing peerless as an operator in the specialty of which this volume is a treatise. If what he has thus advanced be truth, the propositions will take care of themselves, and he will be quite content to submit it to the test of time and the crucial scientific investigation of the future. At some future time we hope to notice some of the new chapters, especially those on inflammation and diagnosis.

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INTERNATIONAL REVIEW OF MEDICAL AND SURGICAL TECHNICS. Vol. I., No. 1. Edited by Joseph H. Warren, A. M., M. D., Charles Everett Warren, M. D., and Willard Everett Smith, M. D. Boston: International Medical Exchange.

This is a new quarterly journal, said to be the official organ of the American Association of the Red Cross, and a portion of its space is devoted to a statement of the objects of that Association, including an editorial, discussing the origin, progress and methods of its workings; also a copy of its constitution and a list of the national and associate societies of the Association, all of which makes an interesting and instructive account of one of the noblest charitable institutions in the world.

The remainder of the journal is made up mainly of clippings from foreign and domestic medical literature, describing new instruments and appliances, the methods of their use, and is valuable in that it furnishes to the practitioner of medicine and surgery a complete and exhaustive account of everything that is new and novel in his line of business. On the whole, we should deem this new aspirant for favorable notice a valuable addition to the list of medical periodical literature.

C. P. H.

WOMAN: An oration delivered before the American Academy of Dental Science. By Norman W. Kingsley, D. D. S. Boston, Nov. 7, 1883.

This is one of Dr. Kingsley's best efforts, and we propose some copious extracts in this or future numbers.

SECOND ANNUAL ANNOUNCEMENT OF THE COLLEGIATE DEPARTMENT OF THE CHICAGO DENTAL INFIRMARY.

"The Executive Committee and Faculty of the Collegiate Department of the Chicago Dental Infirmary, in making the announcement of its second annual course of lectures, are pleased to be able to state that the success attending the first course was greater than they had hoped for, and seems to warrant the belief that the plan advanced by this institution is a practicable one, which must eventually demonstrate its greater value as compared with those of other dental educational institutions.

From correspondence already had with various parties, the prospect is flattering that the coming class will be very much larger than the first. To those desiring to fully qualify themselves for the practice of dentistry, it is believed that this institution offers advantages not to be found elsewhere.

The founders of this institution recognize the necessity that every well-qualified dentist should have a good medical education, and believe that it can be more properly obtained in medical colleges, already established and fully equipped for imparting such education, than in any dental college. This institution therefore requires that its students shall obtain the degree of M. D., before presenting themselves at final examination for the degree of D. D. S., and the courses of lectures in this school are not expected to replace either of the courses required by the medical schools. Our students being thus required to spend three years in medical studies, the teaching in the dental school can be confined strictly to the subjects special to dentistry. The proportion of time devoted to lectures is therefore less, and that given to clinical instruction much greater than is usual in dental colleges.

COURSE OF LECTURES.

The course of lectures commences after the close of the regular courses in the medical schools, enabling students to pursue their dental studies during the interval between the sessions of the medical colleges.

The Faculty recommend that students take at least one course of medical lectures before matriculating in this institution.

The session will open on February 25, 1884, and continue twenty weeks.

Seats will be assigned students in the order in which they pay their fees, and they will be expected to occupy the same during the session.

REQUISITES FOR GRADUATION.

Candidates for graduation must be of good moral character, must have obtained the degree of M. D. from some reputable medical college whose diplomas are recognized by the Illinois State Board of Health, and must have attended two full courses of instruction in some reputable dental school, the last of which must be in this institution.

They must also have *attended 90 per cent. of the lectures* in this institution, and have been in attendance *90 per cent. of the time required in the clinical department.*

Students will also be required to be in attendance at the clinical department for one-half of the vacation, extending from the close of the session in this institution, to the beginning of the sessions in the medical colleges. For this purpose they will be divided into two classes—the first class to attend during the first half of the vacation, and the second during the second half.

They must also treat thoroughly some patient requiring all the usual dental operations, and under the eye of the demonstrator, or some member of the faculty, construct at least one practical, artificial case on metallic base; and they must undergo a satisfactory examination on all the branches taught in this institution."

LETTERS FROM A MOTHER TO A MOTHER ON THE FORMATION, GROWTH AND CARE OF THE TEETH. By the Wife of a Dentist, Mrs. M. W. J. Printed by Judson & Dunlop, Atlanta, Ga.

These "letters" have appeared in the columns of the *Southern Dental Journal*, of which we made editorial note in a recent number. They now appear in pamphlet form, 72 pages, and are a very valuable contribution to that class of literature that is needed to educate the public, especially mothers, on the subjects indicated by the title. The profession will do the public a "good turn" by aiding the general distribution of this work.

CONCERNING RECORDS. By Geo. L. Parmele, M. D., D. M. D., Hartford, Conn.

A neat reprint from the NEW ENGLAND JOURNAL OF DENTISTRY, of January, 1884.

A DIRECTORY OF THE PRACTICING DENTISTS OF THE STATE OF TENNESSEE. Prepared and issued under the supervision of Dr. Henry W. Morgan of Nashville.

TRANSACTIONS OF THE DENTAL SOCIETY OF THE STATE OF NEW YORK, 1882–3. Fourteenth and Fifteenth Annual Meetings.

Well edited, well printed, and full of excellent matter. We propose to copy some of it in future numbers of this journal.

A PHYSICIAN'S SERMON TO YOUNG MEN. By Wm. Pratt, A. M., M. D. Published by M. L. Holbrook & Co., New York.

Should be placed in the hands of every young man.

MONTHLY LIST OF PATENTS.

For Inventions relating to Dentistry and Surgery, bearing date Jan. 22, Feb. 26, and March 24, 1884. Reported expressly for this Journal by Louis Bagger & Co., Mechanical Experts and Solicitors of Patents, Washington, D. C.

291,571—Dental engine hand-piece. A. W. Browne, Pleasant Plains, New York.
291,714—Medical compound. D. A. Green, Scott, N. Y.
291,761—Medical compound. N. A. Lum, Carneiro, Kansas.
291,617—Surgical splint. H. McNaughton, Erin, Ontario, Canada.
291,690—Syringe. J. H. Clarke, Springfield, Ohio.
291,922—Preparing medicated court plaster. C. L. Morey, Comac, N. Y.

292,048—Apparatus for holding and moving invalids. C. F. Reed, Brooklyn, N. Y.
291,950—Veterinary medicine spoon. J. R. Stettheimer and T. Lois, Rochester, N. Y.
291,978—Artificial tooth. E. P. Brown, Flushing, N. Y.
291,946—Spring tooth. A. Shellman, Charleston, Mich.
293,502—Dental engine attachment. J. W. Norwood, Greenville, S. C.
293,501—Dental plugger. J. W. Norwood, Greenville, S. C.
293,739—Relining rubber dental plates. F. T. Hyatt, Norwalk, Ct.
294,286—Dental chair. E. P. Stiles, Austin, Texas.
294,288—Medical compound. G. Taylor, Redding, Cal.
294,667—Dental engine. E. R. Pettit, Philadelphia, Penn.
295,821—Dental vulcanizer. F. W. Seabury, Providence, R. I.

SOCIETIES.

THE NEW YORK ODONTOLOGICAL SOCIETY.

The New York Odontological Society met on the evening of March 18th at the residence of Dr. Bödecker. The event of the evening was an address on "The Chemistry of Anteseptics and Disinfectants," by Prof. Chas. Mayr, of Springfield. The Professor spoke for more than an hour, holding the attention of his hearers throughout, and answering questions in such a manner as to give all the information sought, and also to reveal the fact that he was master of the subject considered.

J. M. H.

MAD RIVER VALLEY DENTAL SOCIETY.

The Mad River Valley Dental Society will hold its annual meeting in the parlor of the Phillips House, Dayton, Ohio, Tuesday, May 20, 1884. Sessions begin at 10 o'clock, A. M., 2 and 7 P. M.

Subjects for discussion :

1. The Value of Pulpless Teeth and Roots.
2. Inflammation.
3. Alveolar Abscess.
4. The Promotion of Osseous Development.
5. Facial Neuralgia.

The Dental Society of the State of New York will meet at Albany, Wednesday and Thursday, May 14 and 15. The Board of Censors will meet at the same place May 13.

J. Ewd. Line, *Secretary.*

SELECTIONS.

ON THE RELATIONS BETWEEN DENTAL LESIONS AND DISEASES OF THE EYE.

BY HENRY POWER, M. B. LOND., F. R. C. S.,

Opthalmic Surgeon at St. Bartholomew's Hospital, and Surgeon to the Royal Westminster Opthalmic Hospital, &c.

[Read at a meeting of the Odontological Society of Great Britain, November 5th, 1883, and reprinted from the Transactions of the Society.]

[Continued from page 81.]

A second case. Two lads sitting at the same desk. One presents a steel pen to the eye of the other, when his head is averted, and calls his name; he turns his head to the speaker, and the nib of the pen makes a punctured wound at the outer border of the cornea. A slight protrusion of the iris takes place. He continues his work, with gradually increasing irritation in the damaged eye, for three weeks, when suddenly vision in the second eye commences to be impaired. He is unable to accommodate his eye for near objects, and iritis sets in. The gravest anxiety is felt that total loss of vision will ensue, but fortunately this result was averted; by keeping the lad in perfect darkness for a month, and by appropriate local and general treatment, the reflex or sympathetic irritation gradually subsided, and by a singular piece of good fortune the injured eye also quieted down, and absolutely perfect vision was recovered in both eyes. This is an unusual result of sympathetic opthalmia.

It is, however, by no means necessary that irritation, even when it is very severe on one side, should necessarily radiate to the opposite eye, or to other nerves.

Curious cases sometimes occur, and it is as difficult to say why inflammation does arise in one case as it is why it does not occur in another.

About 1870 a man presented himself to me at the same clinic with severe injury of the eye, also from a piece of iron broken off the head of a rivet; the eye was laid open by the fragment, and vision was lost. I recommended removal of the globe. The man declined. He went to Maidstone. The surgeon—I believe, Mr. Adams—gave him, he said, the same advice, but he was determined not to have it done. He recommenced his work, and the eye gradually quieted down, but from time to time he suffered severe pain in it, and had to discontinue work for some days; still the other eye remained strong. About two months ago, however, he called at the hospital, and he then had conjunctivitis and some impairment of vision in the healthy eye, whilst the opposite one was tender and painful. I exhorted him to have it removed. He reluctantly, and only after a week or two of deliberation, consented. In the operation for removal I met with a difficulty. After dividing the conjunctiva and muscles, I introduced a pair of scissors, but was unable to divide the optic nerve. Larger and longer scissors were tried, and it was only after considerable trouble that the globe was enucleated. The reason of the difficulty immediately appeared, for a large piece of metal was embedded in the optic nerve, just where it might be expected that it would excite sympathetic opthalmia, yet where it had remained for twelve years, with but slight effect on the opposite eye; for he made a good recovery, and was discharged on the 17th of October, 1883, and has had no trouble since.

If the question be put, How does the irritation or inflammation of one eye come to affect the other—by what path, or paths, does the irritation travel? the reply given, both by exact clinical observation and by pathological investigation, is that in the vast majority of cases there is a neuritis which travels along the ciliary nerves, but in a few instances along the optic nerves, and we shall see that this conduction of the morbid process along the sheaths of the nerve is of considerable importance in enabling some explanation to be given of the occurrence of reflex troubles where the teeth are the seat of the primary lesion.

Injuries affecting the branches of the first division of the fifth pair are well known to affect the eye of the same side, and there are good reasons also for believing that affections of other branches of the fifth pair of nerves may be the cause of opthalmic troubles.

In 1853, M. Decaisne, staff surgeon of the Belgian army, presented to the Academie de Belgique,* under the title of "Sur les dents œillières," a note on the disturbances of vision consequent on alterations of the teeth, in which he states that he saw an officer struck on the forehead with a piece of wood in the course of the frontal nerve, which caused complete blindness, and then remarks that it is not uncommon to see diplopia, or even complete loss of vision, supervene, either with or without ulceration of the cornea, as a result of disease of the maxillary sinus.

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* "Bull. de l'Acad. Med. Belg.," T. XIII., 1853, and "Archiv. Med. Mil.," 1854.

That injuries to the supra-orbital nerve are occasionally followed by amaurosis seems to be well established. A case is recorded by Valsalva* of similar damage in which recovery is stated to have taken place. Unfortunately, however, in these cases the older authors had no means of knowing whether the deeper structures of the eye were injured or not. Some of the cases recorded might well have been accompanied by dislocation of the lens, by hemorrhage in or detachment of the retina, by crushing of the optic nerve in the optic foramen, and by other conditions which the invention of the opthalmoscope would now enable us readily to diagnose, and which can in no way be regarded as of a reflex nature. In one case, for example, the patient was thrown out of a wagon, and in another severely pecked by a turkey-cock. Severe blows and cuts over the brow and cheek may easily produce blindness by intra-ocular mischief, without causing any apparent damage to the surface of the eye. Thus Nossi† reports a case where a peasant was struck by a knife which cut the brow. M. Nicaise‡ states that he has on various occasions noticed the coincidence that exists between affections of the nasal fossæ and those of the eye. He believes he has thus been able to recognize a connection between the occurrence of nasal polypi and glaucoma, attributable to irritation of the many branches of the fifth pair which are distributed to the mucous membrane lining the nasal cavity. Demours§ gives a case of amaurosis supervening after extirpation, *secundem artem*, of a sebaceous cyst of the size of a hazelnut: the same evening inflammation of the eye supervened, and the next morning the eye was lost.

In 1870, M. Delestre published an essay on accidents following extraction of the teeth, and reports several cases which tend to prove the existence of visual troubles. He remarks that odontalgia is often accompanied with weeping and redness of the conjunctiva, with sudden darts of pain and winking of the lids. He considers that there is at first irritation of the branch of the dentary nerve supplying the affected tooth, and which is therefore one of the branches of the superior or of the inferior maxillary nerve. This irritation of one part of the fifth extends to other parts of the fifth, and particularly to the opthalmic, which leads to lachrymation, and redness of the conjunctiva.

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* "Dissert," II. and XI.
† Himly, i, 89.
‡ "Gaz. Med. de Paris," 1871, p. 150.
§ T. I, p. 173.

That the teeth and the eye may be concomitantly affected as the result of some widespread and general disease of the system, as in syphilis, Mr. Hutchinson's observations have made abundantly clear, though there is little doubt that some cases closely resembling those which he has so well and carefully described are the result of other conditions of the system than those appertaining to syphilis; at all events, they occur in children in whom no evidence of syphilis can be obtained from either parent.

I apprehend, however, that this is not exactly included in the subject on which I am about to speak to-night. My object is rather to bring before you some evidence of the occurrence of opthalmic affections as a consequence of dental disease. And the grand difficulty that I have met with in drawing any definite conclusions, is the extreme frequency with which dental affections present themselves. Thus, to take one affection alone, I was desirous of ascertaining whether dental caries and phlyctenular ulcer of the cornea stood to each other in the relation of cause to effect; but on examining the teeth of my young patients with phlyctenulæ, I found they all had carious teeth. It might be said, Is not that evidence that there is a close relation between the two affections? but, unfortunately for this view, the disease can readily be cured—in many instances—by the means usually adopted in opthalmic practice without the extraction of the offending teeth, so that they only fulfill half the old adage constituting a *vera causa*, "*præsens morbum facit, sublata tollit.*"

Having, however, established the existence of reflex irritation of the eye, it will perhaps be the best mode of treating of the various modes in which that irritation may express itself, if we consider it under the three following heads:

1. Reflex irritation affecting striated and unstriated muscle.
2. Reflex irritation affecting the mucous membrane and cornea.
3. Reflex irritation affecting the optic nerve and retina, and intra-ocular tissues.

In regard to reflex irritation affecting muscular tissues, we may mention—

1. Paresis of the ciliary muscle.
2. Paresis of the intra-orbital muscle.
3. Paresis of the muscular fibers of the iris.
4. Paresis of one of the ocular muscles.
5. Paresis of the orbicularis palpebrarum muscle.

One of the commonest forms of visual disturbance, induced by dental disease, is *loss or failure of the power of accommodation.* By power of accommodation is meant the faculty which the eye possesses of adjusting its refraction so that well-defined images of objects situated at different distances from the eye may be formed upon the retina. This is accomplished, as is now well known, by the action of the ciliary muscle, which, by contracting, causes the lens to become thicker. For the lens is normally and, when the eye is at rest, covered anteriorly, and flattened by the anterior capsule, which is stretched by the suspensory ligament; but when near objects are fixed, the ciliary muscle is brought into play. This brings forward the anterior part of the choroid, and relaxes the suspensory ligament, and the lens immediately, by virtue of its own elasticity, becomes thicker, and is thus rendered capable of focussing divergent rays—that is to say, rays proceeding from near objects. The stronger the muscle, and the more elastic the lens, the greater is the degree of accommodation which can be effected; for, under these circumstances, the suspensory ligament can be thoroughly relaxed, and the lens can become highly convex. Hence, accommodation is strong, or has a great range, in children, extending from infinite distance to a point not more than three or four inches from the eye; for in them the ciliary muscle has great power, and the lens is very elastic. In advanced age, on the contrary, the muscle becomes feebler, and the lens is of firmer consistence and much less elastic. The suspensory ligament, consequently, does not undergo much relaxation, and the lens does not swell when the compressing influence of the anterior capsule is withdrawn. Hence the range of accommodation diminishes; distant objects, from which parallel, or approximately parallel, rays proceed, are still accurately focussed upon the retina; but any small object, to be clearly seen, must be held at a distance of ten to twelve or eighteen inches from the eye.

The influence of dental lesions on the accommodation has been particularly investigated by Dr. Hermann Schmidt, of Berlin. This observer examined the eyes of ninety-two patients, who presented themselves at his clinic, suffering from some form of dental disease—such, for example, as caries, periostitis, or neuralgia. Considerable pains was taken to determine the range of accommodation in both eyes, and to compare that on the sound with that on the unsound side; whilst reference was made to the tables of averages for each eye given by Donders. Amongst the ninety-two cases, Schmidt found there were only nineteen cases in which the range of accommodation was normal, or better than normal; in the remaining seventy-three cases the range was lowered, and in most instances considerably reduced.

[To be continued.]

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ORIGINAL COMMUNICATIONS.

A HISTORY OF DENTISTRY.

BY GEORGE H. PERINE, D. D. S., NEW YORK.

[Continued from page 56.]

The Early Practitioners in America.

Prior to the War of Independence there was, so far as we can learn, but one dentist in the American Colonies, and he was an Englishman by the name of Robert Wooffindale. He was born at Sheffield, England, in 1742. He arrived in New York in October, 1766, and divided his time between New York and Philadelphia. He had been in this country but eighteen months when he returned to England and began practice in Liverpool, where he continued until 1789, when he received news of the death of the celebrated dentist, Thomas Berdmore, his preceptor, to whom he gave bonds not to practice his profession in London during Berdmore's life. Being now absolved from his bond, he returned to London, and there began practice, meeting with unparalleled success. It was during the term of his residence in London that he had tendered him the appointment of Dentist to the Prince of Wales, which he however declined. He published in England, in 1783, a work entitled "*Practical Observations on the Human Teeth.*" He came again to America about 1797, and resumed his practice, but he failed to find as clear a field as that he had vacated nearly thirty years before. Wooffindale was a man of experience, and possessed those rare gifts—clear perception and untiring energy—which lead in most cases to the accomplishment of brilliant results. He was the first to insert a full case of artificial teeth, and to employ gold foil for filling, in this country. After practicing in New York about two years he resigned his office to his eldest son, and retired to his country seat on Long Island, where he died October 3, 1828, at the age of 68 years.

The names of John Baker of Philadelphia, and Isaac Greenwood of Boston, appear prominently in the records of the past. Greenwood practiced in Boston at an early period in our history. His two sons, Clarke and John, settled in New York in 1778 and in 1783 respectively. They were probably the first American dentists in that city. John Greenwood was an industrious man, and acquired for himself a worthy reputation. An upper set of teeth carved by him for Washington from hippopotamus ivory is still preserved in the Museum of the Baltimore College of Dental Surgery. That his illustrious patron was well pleased with Greenwood's skill is evident from the expression of satisfaction contained in a letter written by him to the dentist after having worn the teeth some time. They were without doubt good of their kind and for their time. But the thought of the Father of His Country with a row of hippopotamus bone between his gums will doubtless suggest to the non-professional reader a somewhat ludicrous picture, and we must acknowledge that Dr. Greenwood's handiwork, compared with that of the most unskillful practitioner of the present day, looks extremely rude; and, we may add, inappropriate for the purpose for which they were designed. Wm. Pitt was the name of a skillful dentist who was for a considerable time associated in practice with Dr. Greenwood.

Dr. Hayden speaks of one Whitelock, a dentist who about this period came over from England with a theatrical company, but he appears to have left behind him but few traces of success in the practice of the specialty. It is hardly likely that his connection with the stage would tend to prompt him to any very earnest or prolonged efforts of a professional character. The excitement and peculiar fascinations of the strolling players' life, as it existed a century ago, were certainly not likely to shed a charm upon the study and labor necessary to the achievement of permanent success in any profession, particularly that of dentistry.

Perhaps no name among those who were practicing in this country at the close of the last century stands more prominent than that of Le Maire, a French dentist, who came to this country with Lafayette. To him the profession is indebted for a number of inventions and improvements in instruments in use in the operative department, which were at this time in a very imperfect state. Le Maire is credited with considerable skill in practical operations, and especially in transplanting teeth. He settled in Philadelphia, where he undertook the instruction of a few pupils, thus laying the foundation of the dental specialty in this country. In an advertisement published by Le Maire in a Philadelphia paper, in 1784, he offered two guineas each for sound teeth to be obtained from "persons disposed to sell their front teeth or any of them." Le Maire, after several years' practice here, which it is safe to conclude proved remunerative, returned to France, where he soon after died, having reached nearly four score years of age.

A. D. SPENCER, who is generally believed to have been one of Le Maire's pupils, was a man of brilliant professional attainment, who succeeded in winning for himself a desirable reputation in Philadelphia during the early part of our century.

It must be acknowledged that James Gardette, who arrived in Boston upon a French brig-of-war in 1777, did much for the elevation of the science of dentistry in America. He was born at Agen, France, August 13, 1756, and was a man of great refinement and education, having graduated from the Royal Medical School of Paris, after which he entered the hospital of Toulouse, evidently realizing that dental knowledge to a naval surgeon, in which capacity he came to this country, was a necessity. He had carefully studied the specialty in France, with Faudinière. We venture to say that the day is not far distant when the want of dental attention on shipboard, which Dr. Gardette's keen perception recognized, will be supplied; when every government vessel will not only have its dental attendant, but every camp and army hospital throughout the civilized world will be provided with one whose duty it shall be to meet the dental requirements of the now neglected servants of this and other lands.

Gardette, soon after his arrival in this country, resigned his commission, and settled in Newport, R. I., and turned his attention to the practice of dentistry solely. He was provided with the best dental instruments obtainable in France, and was the possessor also of a valuable library. After practicing for a time in Boston, Newport and New York, he made his way to Philadelphia, where he soon acquired a fine reputation for his knowledge and skill. At this period, the majority of our people failed to realize the necessity of dental operations, and the requisite materials used in ordinary practice were obtainable only in London or Paris ; hence, as must be readily understood, Gardette's efforts were attended with more or less inconvenience. He however made many improvements in the ordinary methods of practice, and the instruments in use. He was the first in this country to substitute gold clasps for the wire and silk attachments formerly employed in securing artificial teeth in place. He also introduced a gold swedged plate, to which the substituted teeth were attached in such a manner as to allow them to rest upon the gum instead of the gold. He is recorded as one of the first to apply the principle of atmospheric pressure for the support of entire upper sets of artificial teeth, which displaced spiral springs and other cumbersome contrivances then in use. He was also among the first who adopted the use of gold foil (introduced into practice here by Wooffindale) in place of lead or tin for filling teeth, and it is stated that he, at one period when there was no gold-beater in the country who could furnish such foil as he required, made such from Dutch ducats. His treatment of dental diseases was of equally as advanced a character. He advocated extraction of the teeth at an early age, when necessary, to afford space for the proper arrangement of the second dentition, and he also expressed it as his conviction that decay often arose from lateral pressure, "owing to the circle of the jaw being too narrow to accommodate the number of the teeth when of an unusual size." It was probably Gardette's limited knowledge of our language which prevented him from giving the profession in this country a clear account of his improvements and views. His only publication was, we believe, a short paper opposing the transplanting of teeth, which appeared in the *Medical Record* of January, 1827. In 1829 he carried out a long cherished desire, that of returning to his native country after an absence of fifty-two years, where at Bordeaux, in 1831, his long and useful life terminated.

JOSEPH FLAGG was another of Le Maire's pupils, and from the record he has left behind him he certainly proved a credit to his instructor. His knowledge of the profession was gained while the French and American army, with which he was connected, were in winter quarters near Providence, R. I., in 1781–82. When war was proclaimed between Great Britain and the United States, in 1812, Flagg again entered the army. He was taken prisoner and carried to England where, while on parol, he made the acquaintance of Sir Astley Cooper, whose assistant he became at Guy's hospital. Previous to the breaking out of the war of 1812, he had practiced dentistry in Boston, and on his return from England he again applied himself to his profesion in the same city, of which he was, we believe, a native. Dr. Flagg was exceedingly expert in the artificial department of dentistry. A circular issued by him, about 1790, states that he "sews up harelips, and fixes gold roofs and palates, greatly assisting the pronunciation and the swallow." His experience at Guy's hospital doubtless did much toward perfecting his knowledge of, and greatly augmenting his skill in, surgical operations.

Next in order after Dr. Flagg comes the name of Edward Hudson, who was undoubtedly in several respects one of the most remarkable men the profession has produced. Not only was he very skillful as a practitioner, but he possessed artistic and literary attainments of a high order, which everywhere and at all times insured to him an elevated social position, while the political difficulties in which he became entangled, together with those whose names will forever live in the history of Ireland (his birthplace), made him an object of considerable interest in this country. He was a graduate of Trinity College, Dublin, but studied dentistry with a cousin, who was prominent in that city as an able practitioner. In the year 1798 he was arrested by the British government on a charge of conspiracy, and for four years imprisoned in Fort George, Scotland. Upon his release from confinement, he came to this country, and settled in Philadelphia, where he undertook the practice of the specialty. He did not at first, however, meet with much encouragement, owing in a measure, no doubt, to Gardette's popularity in the Quaker city; hence, he turned his attention at intervals to various outside business enterprises which, however, proved only a succession of financial disasters. At length he settled down with the fixed determination of giving his exclusive attention to his profession, and his perseverance and patience were after a little time rewarded with success in the recognition of his abilities. All classes of people were beginning to understand that diseased teeth, instead of being extracted, could be preserved by proper treatment, and the fact that Dr. Hudson understood the means of accomplishing the desired object soon became acknowledged. Hence, his fame for the successful performance of surgical operations increased with rapidity, and it is claimed for him that many of the operations he performed were equal to those accomplished under the methods of practice of the present day. About the year 1820 Dr. Hudson introduced a cast plate as a base for artificial teeth, but owing to the method of manipulating, it did not meet with any degree of favor in his time. Unfortunately, reliable records of Hudson's professional movements are but meagre, and we are unable to discover any professional writings which he may have left behind. The stormy haze of romance which enveloped this gifted and worthy man's life ended in January, 1833, at the age of 61 years.

The next name among the pioneers of dentistry in this country, worthy of mention, is Jabez Parkhurst, a native of New Jersey who, after devoting himself to the study of medicine, began his professional career in dentistry. He removed to New York in the year 1799, where he soon established a fine reputation as an expert operator and skillful dentist. He died in 1829, leaving a son to succeed him in practice.

The reader will observe that up to the close of the eighteenth century improvements in method and instruments were by no means numerous in this country, nor could any more rapid advancement be reasonably expected, taking into consideration the limited number of skillful practitioners to be found on this side of the Atlantic. In the professional records given in the succeeding chapters, however, a rapid growth and liberal contribution to methodical and mechanical requirements will be noticeable.

[To be continued.]

OUR NEW YORK LETTER.

The plot thickens! The old war-horses of the profession, while scenting the fray from afar, show no signs of terror at the prospect, but are, on the contrary, evidently anxious for the combat.

The attitude of the *professional* profession toward the "Sheffield Tooth Crown Co.," or the "International Tooth Crown Co.," or whatever it is, has changed.

Until recently the profession has looked upon this concern and its double column advertisements as they have upon the proprietors and advertisements of "Harris' Harassing Hair Harbinger," or any other "cure-all," whispering a low "*quack*" to themselves, perhaps, but not disposed to interfere with its course as long as they were not encroached upon, remembering, possibly, the old adage: "Wrestling with a dirty dog, if you are not thrown, you are dirtied." Now, however, the profession seems to be placed in a position where they must either fight or humbly bend their necks for a yoke not easier to bear than was the Goodyear patent, and one more galling, as the royalties would be upon patents on methods in use for years, and originated, perhaps, in their own offices.

In the fables of olden times, the cutting off of one head of a dragon is said to be followed by the growing out of a number of others, all more ugly than the one destroyed. Will it be so now if steps are taken to check in any direction the growth of this particular dragon? We hope not, though it does seem as if every movement made by professional dentists against the Sheffields, from their expulsion from the dental societies to the many other expressions of contempt shown them, has resulted in, or at least been followed by, a growth of their prosperity. The master spirit of the so-called Sheffield Co. has very evidently had a series of plans which he has thus far been very successful in carrying out. He is said to have made the statement that "in time he would have every member of the dental profession at his feet"—whatever that may mean—and the procuring of patents upon all the so-called Richmond methods, the ousting of the Richmonds when he had used them all he wished, and the issue of licenses to dentists, all seem, indeed, to be steps in that direction. These licenses are "bold, bad" documents. They are issued for one year only, and give their fortunate (?) purchaser permission to use said methods in consideration of a sum of money and the subscription by the purchaser to several iron-clad oaths, binding him to all sorts of things, one of which is that he will not take or join in any action against the company during any of the many years the patents have to run, even though they—the Sheffields—(and they reserve the right to do it) refuse to renew the license at the end of the first or any year.

In order to procure the patents, Cassius M. Richmond did take oath that the methods in question were original with him and that they were new, having been in use less than two years. As they were not applied for until January, 1883, it would be an easy matter, of course, to prove that the methods had been in use many years before the application was made, and therefore the patents were fraudulently obtained. These Richmond patents are now owned by the Sheffields and were obtained with their assistance. Dr. C. M. Richmond is under indictment for perjury on account of his share in the fraud; have his abettors done anything criminal and can they be held responsible for their misdeeds?

These questions and others were asked at the March meeting of the First District Dental Society, by one of its most influential members, who made the assertion that if the half could be proved of which he thought the Sheffield Co. guilty, "our state prisons have not been built in vain."

Considerable interest was taken by those present in the remarks of a celebrated patent lawyer who has been the attorney of the Richmonds against the Sheffields, and therefore understanding the case perfectly from a legal standpoint. Being invited to address the meeting, this gentleman gave the members much information concerning the patents, and what he considered to be the "criminality" of the Sheffields on account of the part they had played in procuring them. He also told of a comparatively recent national law which relates to the forfeiture of land grants when they can be proved to have been obtained through fraud; also of the recent very important decision of Judge Wallace that this law also applies to *patents* which have been fraudulently obtained. Therefore, this gentleman reasoned that as it would be a simple matter to prove that fraud had been practiced in procuring these patents, it would be only a question of delay which the Sheffields could cause by the free use of money, when dentists would be able to have them set aside. The matter was discussep as freely as limited time would allow, and the temper of those present was very evidently in favor of raising money for the purpose of pushing the matter at once, but after a vote upon the question it was at length decided to let the subject rest until the next meeting.

After voting ten dollars each to the porters of the S. S. White Dental Manufacturing Co. for their care of the society at their monthly meetings, refusing to entertain Dr. Francis' resignation, and listening to Dr. Bödecker's excellent paper on Iodoform, the society adjourned.

The minds of the leading New York dentists are at present somewhat disturbed over the subject of cylinder filling—*pro* and *con*. The tinder has been quite ready to ignite for some time, and the spark was applied at the February meeting of the Odontological Society by one of its members who, during the discussion on Prof. Fillebrown's excellent paper on "Gold and Its Manipulation," made the assertion that not only was cohesive gold the only gold to use, but that a perfect or durable filling could not be made with cylinders. This remark called forth a reply from an advocate and very successful practitioner of cylinder fillings, the same gentleman who, a few years ago, sent teeth with cavities in them to those of his associates of whose work he had the highest opinion, with the request that they should fill them, each after his own fashion, he to bear all incurred expense, and afterwards they should be subjected to all possible tests bearing upon their relative excellence. All complied with the request save one, whose refusal—he being the most earnest advocate of the use of cohesive gold, and curiously enough the same gentleman whose severe condemnation of cylinder filling is noted above—was mainly instrumental in causing the experiments to be dropped.

The discussion of the relative merits of the two methods now seems to be fully opened again, and it is possible that some practical tests may be made by the advocates of each method which will allow conservative outsiders, at least, to come to some decision. One thing is certain, the end is not yet.

D.

TRANSLATIONS.

SPECIAL RESULTS OF THE BERLIN HYGIENIC EXHIBITION, CONCERNING THE METHOD OF EXAMINING FUNGI, AND THE MEANS EMPLOYED FOR PREVENTING THEIR FORMATION.

BY DR. H. BÜCHNER.

[Translated from the Aerztliches Intelligenzblatt, Nov. 27, 1883, by A. M. Dudley, D. D. S.]

Considering the importance which is given at present to mycological discoveries, and which may in a very short time be greatly increased, it appears evidently necessary for the practitioner to be informed more minutely of the progress made in this new branch of medical science. Hygiene, especially, may look forward to a considerable revolution by admitting mycological methods among its researches. In connection with, and even previous to, chemical methods of investigation, methods of mycological examination will, not long hence, be put into practice; for it is evident after now having the real origin of sickness, the true cause in the fungi, before us, necessarily the chief interest will have to be given to this subject.

On this account a justification is scarcely necessary for entering into more minute details about recent mycological investigations and the instruments pertaining thereto. Many a reader may, perhaps, be thereby instigated to deeper studies and to personal effort—an intention which will meet with no particular obstacle by the comparatively slight difficulties of the methods herein described.

At the Hygienic Exposition we were especially led to expect an illustration of the hygienically important mycological methods. This expectation has been amply realized by the Imperial Board of Health. Not only were the important relative objects and instruments placed in a separate pavilion, but care was taken that the visitor should obtain a perfect representation of those methods which are applied by the State Board of Health to examine and prove the presence of the micro-organisms in the soil, air and water, and which have proved practically successful.

To this section of the exhibition the following report shall therefore be devoted. It shall further take into consideration those practically important methods and processes brought forward in the exhibition which may appear applicable to prevent threatening danger on the part of pathologenic micro-organisms, and which therefore merit the attention of practical hygiene. These practical methods will be considered in the second part of this report.

1. *Investigation and Proof of Micro-Organisms.*—The micro-organisms in question are principally cloven and mildew fungi—mainly the former. In order to prove the existence of such in the soil, water, etc., their number must first be increased by breeding, as single examples among other objects, such as particles of soil, might not be detected, or, at least, their species might not be recognized. The breeding is effected in liquids of suitable combinations, called breeding solutions, or in solids containing nutritious matter and water, on a solid productive soil. Both breeding methods have certain indications; each one has certain advantages above the other, and the rational searcher will therefore make use of both methods as they respectively present themselves.

It is erroneous to maintain, as is at present done in many cases, that breeding on solid matter is the only correct method. To be sure, for certain purposes, especially hygienic ones, this method is preferable, as it enables one in the most easy manner to prove existing micro-organisms. Breeding on solid matter, therefore, permits the development of a mycological method, which is of considerable value to hygiene as an extension of its means of research; breeding is the foundation of a hygienic mycological method. The reasons why this is the case are easily evident. The developing fungi remain clustered together, on a solid substance, and do not, as in a liquid, spread all about. The former method enables different forms of fungi, closely connected, to be cultivated on a limited space, without disturbance, for the purpose of diagnosis, which would be impossible in a liquid, for it happens, as in a soil or water test, that different kinds of fungi appear at the same time. By application of fluids we were, on the contrary, till now, always forced to distribute the material to be investigated into the smallest possible portions on very many separate sterilized glasses, so as to allow, if possible, only one single fungus to grow undisturbed. Such a row of glasses can now be substituted by a single plate of nutritious gelatine.

By means of the colony-like growth on solid soil, that is, by the fact that thousands and millions of similar microscopic individual fungi lie closely together, we further notice certain peculiarities, plainly with the naked eye, which could not be detected in the single individual fungi on account of its extraordinary smallness. Among these we may name the colors: white, blue, green, yellow, brown, red, etc., which very often afford a clue to discovering what kind of a fungus we have to deal with. In like manner, the fungi colonies often show an especial form of growth on solid soil, such as oval-shaped, striped, scaly, curly, etc., which may also be of value in the diagnosis. For this reason the application of solid matter for purposes of breeding is far superior to liquids, especially when it is a question of diagnosis of micro-organisms for hygienic purposes and also for the investigation of pathogenic fungi from diseased organs. The brilliant results of R. Koch may be chiefly ascribed to this method applied by him.

[To be continued.]

DENTAL SERVICE IN PUBLIC SCHOOLS.—The Municipal Council of Paris has arranged to have a periodical inspection of the teeth (as well as the eyes and ears) of the pupils in the public schools.

A BOY describes the method of extracting teeth in this way: "The doctor hitched fast to me, pulled his best, and just before it killed me the tooth came out."

SELECTIONS.

ON THE RELATIONS BETWEEN DENTAL LESIONS AND DISEASES OF THE EYE.

BY HENRY POWER, M. B. LOND., F. R. C. S.,

Opthalmic Surgeon at St. Bartholomew's Hospital, and Surgeon to the Royal Westminster Opthalmic Hospital, &c.

[Read at a meeting of the Odontological Society of Great Britain, November 5th, 1883, and reprinted from the Transactions of the Society.]

[Continued from page 168.]

In unilateral odontalgia, the range of accommodation was reduced on the same side in thirty cases. In fifty-one cases there was no difference in the diminution of the range of accommodation perceptible. In one case, the eye of the side opposite to the unsound teeth was the weaker of the two. In nine cases the teeth were carious on both sides. It appeared further that the influence of dental lesions on the accommodation was more frequent, the younger the patient, the ages between ten and twenty being those in which the paresis was most marked. After thirty years of age the impairment of the power of accommodation was much less frequently observed.

The influence of sex was not noticeable.

In regard to the locality of the dental lesion: in forty-one cases in which the upper maxilla was affected, paresis of accommodation was observed seventeen times. In thirty-nine cases in which the lower jaw was affected, the paresis was observed nineteen times. Disease of the teeth of the lower jaw, therefore, appeared to be somewhat more effective in producing failure of accommodation than that of the upper jaw. Disease of the incisors, and of the first, third and fifth back teeth, using the German mode of notation, appeared to be more frequently associated with the ocular disturbance than lesion of the canines, or of the second and fourth back teeth.

The nature of the dental lesion appeared to be of little importance, great impairment of accommodation accompanying comparatively slight disease, whilst extensive disease of the teeth, accompanied by severe pain, was associated in some instances with only slight paresis of accommodation.

Dental lesions appeared to have no effect upon the sharpness of vision.

The impairment of the power of accommodation was only rarely noticed by the patients themselves, which perhaps might be in part attributable to the circumstance that in most cases, if the patients were suffering much pain the ordinary avocations were suspended.

The explanation of this remarkable effect of dental lesion is not quite clear. Two views may, it appears to me, be taken of it. We may regard it as of a reflex character, and as being analogous to that weakness or paralysis of certain muscles observed in some of the reflex paralyses of infancy, and which we may consider to be of the nature of an inhibitory influence, since they rapidly supervene and rapidly vanish; or we may regard it as a simple result of the generally lowered tone of the system, consequent on the depressing influence exerted by the dental lesion. I need hardly dwell on the extraordinarily powerful effect on the nervo-muscular and circulatory systems of prolonged toothache, or how the impairment of the digestive functions, the sleeplessness, and general feeling of malaise, lower the tone of the nervous system, and produce indisposition for all kinds of mental and bodily exertion. There can be little doubt that the sympathetic nervous system and the unstriated muscles participate in this depression; and we can easily understand how there is a corresponding diminution in the power of the ciliary muscle, and failure of accommodation. . . . .

To enable us to speak quite positively upon the influence of carious or painful teeth upon the accommodation we require information that is very rarely attainable. We ought to know that the accommodation was thoroughly good before the teeth were affected, that the failure of accommodation occurred simultaneously, or soon after the dental lesion; and, finally, that after the removal of teeth, recovery of the accommodation power takes place.

In the majority of cases we must rely upon the patient's word for the first of these factors of our judgment; and in regard to the second, so many persons of both sexes, and all ages, are affected with dental disease that if this be a *vera causa*, good accommodation would be the possession of only a favored few; whilst lastly, even Schmidt, who paid particular attention to the subject, was only able to examine eight cases out of nearly a hundred, after the extraction of the offending tooth or teeth. In five of these, however, distinct improvement was observed. The diminution in the power of accommodation was in each case characterized by the recession of the near point, whilst the far point remained unaltered. After extraction of the affected teeth the near point approximated to the eye.

Another class of cases in which a reflex influence appears to be exerted upon muscular tissue is that in which the muscular tissue of the iris is affected. This condition is termed *iridoplegia* or *mydriasis*. In it the pupil is widely dilated and motionless, owing, as is generally believed, to paralysis of the sphincter pupillæ, which is supplied by the ciliary nerves containing branches of the third nerve; but it is possible that it may be due to contraction of the dilatator iridis, if such a muscle really exists, and this might be produced either by irritation of the branches of the sympathetic or of the fifth pair, which Bilogh believes supply it.

It is remarkable and suggestive of its mode of origin that mydriasis rarely if ever occurs simultaneously on both sides, and in many cases that I have seen in past years I have scarcely ever been able to trace the ætiology, though I must admit that I have not paid special attention to the teeth. It is instructive to find that in one case recorded by Desmarres, a cure was effected by the extraction of a carious molar, and in future I shall certainly, in any case of the kind that may present itself, make a careful examination of the teeth.

In the cases that have fallen under my care the dilatation of the pupil has been permanent, which points rather to some organic lesion, such as might be produced by neuritis, than to any inhibitory influence.

One case, and so far as I know one case only, of *exophthalmia* has been placed on record. It is contained in a recent number of the "Recueil d'Ophthalmologie" of Galezowski, 1882, p. 441, and is reported by Weinberg. The chief facts of the case are that a widow presented herself in the out-patient department with an exopthalmia, accompanied by severe pain of the right eye. She had suffered for thirty-five years from epileptic vertigo and cramp of the stomach. In the month of March of last year she had an attack of phlebitis of the left femoral vein, and on examination she had varices in this leg, and some œdema of the left leg. For five weeks previous she had experienced noises in the right ear, with fronto-temporal cephalalgia of the same side and pricking sensations of the eye, which lost its normal aspect, and she had intermittent sleeplessness. The pricking sensations gave place to lacinating pain, the eye reddened, and the bulbar conjunctiva was strongly injected. For four days previous to her appearance the vision had become hazy.

On examination the tension was found to be + 1, and there was exophthalmia of the right eye. The cornea was hazy; the palpebral and bulbar conjunctiva were much injected; the movements of the eye outwards and inwards were insufficient. Opthalmoscopic examination showed floating particles in the vitreous, and as she was *myopic* a crescent, the peripheric retinal veins were injected. The whole retina was redder than natural; near the macula were several hemorrhagic spots. The heart, arteries, lungs, and the urine were normal. She could read No. 1 at three inches distance. Two leeches were ordered to the right temple; alternating instillations of atropine and eserine were ordered, but the former gave pain and was discontinued.

Ten days later, severe periorbital pain being experienced, with acute chemosis, the teeth were examined, and two carious teeth and a stump were found and promptly extracted. The results were remarkable. In the course of three days the patient was greatly improved in health, the chemosis had disappeared, as well as the injection of the conjunctiva, and above all the exopthalmia.

In such a case as this we might attribute the relaxation of the vessels spoken of as conjunctivitis to paralysis of the vaso-motor system, and consequent passive dilatation of the conjunctival capillaries; whilst the protrusion of the globe may have been due to relaxation and loss of tone of Turner's periorbital unstriated muscle and of the several recti muscles, as well as to relaxation of the vascular and lymphatic systems behind the globe—all conditions that are explicable on an inhibitory influence being exerted by the damaged tooth.

That *strabismus* may be induced by dentition, and especially by difficult dentition, is, I think, generally admitted. Travers, as long ago as 1824, wrote: "Strabismus is also a symptom of irritation arising from difficult dentition." Many cases of strabismus come on quite suddenly, sometimes without the occurrence of any fit, but oftentimes immediately after a fit during the first year of life, and therefore, when the muscular exertion of the eye, requisite to be made to effect accommodation can have had nothing to do with it; for few children look intently at near objects, when alone the accommodation is brought into play, during the first few months of their existence. Yet the opinion that dentition is a cause of strabismus seems to rest on general consensus of opinion only, rather than upon any special well-authenticated cases. And the frequency with which it is referred to in recent books is much less than was formerly customary; in fact, in some of the more recent treatises in Germany and France it is not even mentioned. This is attributable to the important generalization of the ætiology of strabismus made by Donders, that in by far the greater number of cases it is due to hypermetropia.

The time at my disposal will not permit me to enter into any details in regard to the mode in which hypermetropia, or long-sightedness, leads to strabismus, but it will be enough to say that the hypermetropic eye is a flattened eye, that in accommodation for near objects great convergence of the eyes is required, and that a powerful and sustained nervous impulse is required in order that a near object should be fixed by both eyes, and that, owing to defective association between the effort for accommodation and that for convergence, convergent squint is frequently induced.

Other striated muscles that have been noticed as being occasionally affected in a reflex manner by disease of the teeth have been the levator palpebræ and the orbicularis palpebrarum; the former supplied by the third nerve, the latter by the seventh; the paralysis or paresis of the former leading to more or less expressed *ptosis*, the latter to *lagophthalmos*. Ely has recorded three good cases of such affections, in one of which there was paresis of the orbicularis palpebrarum, with irregular spasm of the ciliary muscle and monocular diplopia. In another there was paresis of the rectus internus and ciliary muscles, and in a third case partial paresis of the third nerve.

An affection that is not unfrequently observed is that which is termed *blepharospasm* or incessant winking of the lids, the movement being sometimes limited to the orbicularis palbebrarum, but at others extending to other muscles, such as the zygomatici and levatores anguli oris. This affection is well known to be associated with the error of refraction known as hypermetropia, when a powerful effort of contraction of the ciliary muscle is demanded. The impulse emanating from the brain, instead of being limited to the nerve supplying the ciliary muscle, has a strong tendency to radiate through other channels, and consequently to affect other muscles; whilst in some instances the secreto-motory fibres of the fifth nerve are excited and a copious discharge of tears results.

But that similar conditions may be established in a reflex manner by some lesion of other nerves is well shown by a case that was reported many years ago, by Von Gräfe, to the Medical Society of Berlin. In this instance the blepharospasm ceased almost instantaneously when pressure was made upon a point situated below the alveolus of the third inferior molar tooth. At this point an incision was made down to the bone, but without modifying the blepharospasm in any appreciable degree. But having then established the fact that compression of the sub-orbital nerve and of the temporal branch of the malar materially diminished the spasm, section of these nerves was performed. The spasm immediately ceased, and the case was thought to be cured, but it reappeared at the expiration of a fortnight. The section of the inferior dental nerve performed within the mouth ultimately caused the blepharospasm to cease entirely, and it had not reappeared four weeks after. A case of convulsive tic, as he terms it, has also been recorded by Mitchell, which, supervening spontaneously, was propagated to the muscles of the neck and arms, and which entirely disappeared after the removal of several teeth.

As additional evidence of the influence of the stimulation of other and distant parts of the nervous system on the orbicularis may be mentioned the observations of Claude Bernard; for this experimenter found that section of the sympathetic is followed by partial closure of the lids, and inversely if blepharospasm is induced in an animal by irritating the cornea with some caustic substance it may be removed by galvanizing the sympathetic in the neck, when the lids open immediately, as by magic.

From the consideration of the influence of carious and painful teeth upon the striated and unstriated muscular tissue of the eye, I pass to that which they may be supposed to exert upon the conjunctiva, cornea and sclerotic. And I would refer in the first instance, to the affection named phlyctenular ophthalmia, which is very frequently associated with carious teeth, and which I believe to be often caused by them.

Phlyctenular ophthalmia consists in the appearance of one or more small vesicles, soon bursting and forming ulcers around the margin of the cornea, or on the surface of the cornea, or of the sclerotic. Sometimes only one is formed; at others a succession appears. They sometimes produce little or no uneasiness; at others they are attended with great intolerance of light, and abundant lachrymation. The child—for the disease occurs more frequently in children—keeps in the dark during the day and only becomes lively at night.

The pathology of this disease is tolerably well known. It is believed to result from an inflammatory process, attended with the proliferation of the nuclei along the sheaths of the nerve. The nuclei gradually advance towards the surface along the conjunctival, corneal and sclerotic branches of the fifth nerve, and accumulating on the surface, form, with a little fluid, the contents of the vesicle, and when the vesicle bursts they gradually break down and disappear.

Now in cases of phlyctenular disease I have been accustomed to give minute directions in regard to diet, believing that this affection owed its origin to reflex irritation of the nerves of the eye, consequent upon some disturbance of the stomach and intestinal canal; and to the mothers of the numerous little patients suffering from this affection in our ophthalmic hospitals, I have been accustomed, after ordering a brisk purge and some quinine, to say, "Attend to its diet; no sweets, no pastry, no raw fruit. Give it bread and milk, finely cut-up meat and potatoes," and I am perfectly satisfied with the result of that treatment; but it has occurred to me that the view I have hitherto entertained of the ætiology of the disease may be erroneous, and that instead of the stomach, the teeth are perhaps the organs at fault. It is easy to comprehend that the mastication of raw apples, candied lemon and orange peel, jam tarts, and the like, lead to the impaction of acid and fermentable substances in the cracks and crannies of the teeth, especially if these are carious, and that remaining there for hours or days, if the due cleansing of the mouth after food is neglected, such particles may set up inflammatory troubles which may propagate themselves along the nerve and lead to what we term reflex phlyctenular inflammation of the eye.

No doubt there are many exceptions to the rule that carious teeth and phlyctenula of the conjunctiva are associated, but I have noticed that a large proportion of the children who have phlyctenular ophthalmia have also carious teeth. Surely this is very suggestive of the ætiology of the affection.

The occurrence of inflammation of the conjunctiva in such cases as the foregoing, as Weinberg remarks, may be explained on two theories: on the one hand, when any organ is under the influence of some stimulus, this influence may modify the nerve filaments which terminate in this organ, and thus occasion phenomena of a reflex nature, either in the eye or elsewhere.

But it may also happen that the irritative process itself, whatever that may be, may propagate itself until it reaches the filaments which excite the neighboring organ. It is evident that this can only happen when the filaments supplying the affected organs are derived from the same nerve, or when there are anastomoses between two nerves distributed to different organs. The two kinds of propagation, he observes, are well exemplified in the case of a carious tooth. In one instance there shall be well-marked conjunctivitis which resists ordinary treatment. The mouth is examined and a carious tooth is found the very existence of which is unknown or forgotten by the patient, so slight has been the inconvenience he has experienced from its presence. The tooth is extracted, and the conjunctivitis forthwith and spontaneously disappears. This is a case of purely reflex action. But other cases are met with in which odontalgia is present, and in which the redness of the conjunctiva is accompanied with the small phlyctenular ulcers to which attention has just been drawn, with chemosis and some impairment of vision. The pathogeny of this affection is more complex; part of the symptoms are here due to reflex irritation, but part also to an extension of the dental neuritis to the ophthalmic branch.

In the course of nine months' out-patient practice, Weinberg believes he met with 188 cases of ocular disease dependent on dental lesion.

I have some reason for believing that serious lesions of the cornea may be primarily due to carious teeth, and I will venture to give you the heads of a case that I watched with much interest, but which ended disastrously so far as the eye was concerned.

J. F., a stout, ruddy Scotch girl, aged twenty-four, previously healthy and with good family history, suddenly, after exposure to cold, was seized with a sudden sharp pain on left side of face. The vision was then good on that side, but after a few days became dim. A small circumscribed collection of pus formed exactly in the center of the cornea, and she was then brought to me. She was treated for a few days with quinine and hydrargyrum c. creta, and with atropine drops, no improvement resulting. I performed paracentesis corneæ at the side of the cornea, which the girl bore without flinching. Slight improvement followed. Local depletion, in the form of leeches and blisters, and general tonic remedies, strychnia and iron, were prescribed; but, the case dragging on, I again determined to tap the cornea, and this time passed the needle through the little abscess. The extreme indifference she showed to the puncture attracted my attention, and I then discovered that the cornea was anæsthetic, and that the sensation of the whole region supplied by the ophthalmic branch of the fifth was greatly impaired, though not quite lost. She was a servant, and as the case was likely to prove a troublesome one, she was taken into St. Bartholomew's Hospital under my care. The abscess had now become an ulcer; the cornea was generally hazy; there was much conjunctivitis, but no chemosis. She could distinguish the points of a pair of compasses at a distance of 1·5 c. m. over right brow, but only at a distance of 4·5 c. m. over left brow.

Special attention was now paid to the teeth. She stated that she had suffered much from toothache, and several carious teeth were found in both jaws, but especially on the left side. Four molars were extracted at once. In the course of a month from this time the cornea had become clearer; some hypopyon previously present disappeared. The iris could be seen, and vision which had been almost lost recovered sufficiently to enable her to count figures, whilst the anæsthesia of the globe almost vanished. She left the hospital and took a cook's place, but she returned about seven months after, stating that the eye had slowly deteriorated, perhaps from exposure to heat, and although there was now no loss of sensibility, the inflammation of the cornea and of the sclerotic, and the general discomfort from the condition of the globe, preventing her from doing her work, was so great that I determined to perform abscission, which was done nearly a year after the commencement of the disease, and the girl made a good recovery.

The lesion of the cornea in such a case as this may be referred to its anæsthetic condition; but the question arises, What caused the anæsthesia? and I can suggest no cause for it except that her teeth were seriously affected.

[To be continued.]

DEATH IN THE DENTIST'S CHAIR.—The wife of a prominent physician of Portsmouth, Va., died March 9, at that place, from the effects of chloroform administered previous to the extraction of some of her teeth. There have also been three deaths from chloroform at Baltimore since October, 1882. When will dentists cease to meddle with this most fatal agent?

THE COUNCILLORS OF THE MASSACHUSETTS MEDICAL SOCIETY have voted that Columbus Medical College be dropped from the list of medical colleges whose diplomas are recognized.

EDITORIAL.

CRITICISMS.

In the April number of the *New England Journal of Dentistry* the question of vulcanized rubber is again brought up by well-known Dr. Haskell. That mercurialism came from vulcanized plates, we doubt; we doubt it so much that our doubt is almost conviction. What were the exact symptoms of these mercurial poisonings? The simple idea of even the best of authorities declaring something mercurial poisoning, does not prove the least. Through many centuries people have been abused with mercury, and what we might almost call hereditary aversion against mercury was thus produced. Every sore mouth is right away attributed to mercury, especially by the observer who has been treated to a homeopathic training with all its reasoning and faith, equal to that of a revivalist. Such an observer simply declares these things to be so, as a kind of self-evident truth, like $2 \times 2 = 4$, and yet all, everything about it, rests on guesses, notions and hearsay.

Dr. Haskell does not believe much in the mercurial poisoning, but he thinks the non-conductibility to be the chief producer of the trouble. It is one of the factors, there is no doubt, but there are some other factors not to be lost sight of. One has been mentioned in this journal before, in a little article about the defective smoothness of dental plates, in consequence of which the tissues do not fit closely and allow the accumulation between plate and gums of putrid mucus and irritating secretions. The fact that a simple covering of the rubber plates with the Robinson felt foil has produced exactly the same improvement as the use of metal plates, shows that this view of the importance of smoothness has something in its favor. Does not Dr. Haskell observe the same amount of absorption where there is catarrh of the mouth without any special plate being worn? We agree in the general result, but we think as metal plates are superior to vulcanite or celluloid, that the causes are also to be looked for in the defective cleanliness of the plate which is brought about by the imperfect smoothness. Even celluloid is softened superficially by the action of the liquids of the mouth, and thereby loses its smoothness, whilst "continuous gum work" and plates of metal never are liable to this defect. Patients who cannot afford metal plates very often are of less cleanly habits than those who can, and they too often wear their rubber plates for weeks without sufficiently cleansing mouth or plates, while the richer class not only can afford these excellent smooth metallic plates but, besides, have been trained from early childhood to give a good deal of attention to the cleanliness of mouths, gums and teeth.

Dr. F. Y. Clark publishes an excellent article in the April number of this journal, criticising some of Dr. Miller's reasoning. It appeared to us a very careful and interesting article, and we agree with Dr. Clark in many of his deductions, not because we consider him superior as an investigator to Dr. Miller, who has at his disposal the incomparable apparatus of that great alma mater of Berlin, the principal University of the German empire, with her 4,000 students and 150 professors and teachers, but because the reasoning of Dr. Miller does n't seem to us up to his investigating skill.

In the April number of the *Dental Headlight*, Dr. W. H. Morgan, of Nashville, has a very good article on the treatment of pulpless teeth. He speaks of the antiseptic properties of the oxy-chloride of zinc. The only way in which we can conceive that oxy-chloride of zinc possesses antiseptic properties is by its hermetically sealing up a cavity and not letting in any promoters of sepsis. The insoluble oxy-chloride could, as such, be only an antiseptic if it was soluble; but the Doctor could very easily test the assertion. He could put any amount of oxy-chloride globules into a solution capable of sepsis, and he will not find that they prevent any sepsis; that is, they do not prevent fermentation or putrefaction, at least not until a great amount of zinc has been dissolved in the acid generated during the fermentation.

The Doctor says: "Arsenic being one of the best antiseptics and one of the best germicides known." We take exception to that statement. Let the Doctor try the experiment. He may put some meat in a solution of arsenic, about 1:200, and if after four weeks the Doctor is not convinced that arsenic does not prevent sepsis, we will confess beaten. We have to be clear what sepsis means and what an antiseptic has to do. With sepsis, or, as what we almost consider the same, putrefaction, we understand the decomposition of albuminous substances by lower organisms into products which are offensive to our senses. An antiseptic can properly be called only a substance which by its presence and readiness of action in very small quantities—say less than one in a thousand—prevents putrefaction. If we use sugar strong enough, it is a perfect antiseptic; also salt, in the proportion of 1–10 water, is a perfect antiseptic. Mercuric chloride in the proportion of 1 :50,000, arsenic in the proportion of 1 :20, sulphuric acid in the proportion of 1 :100, are antiseptics ; but if less concentrated, all these substances lose their antiseptic properties ; last of all, the bichloride of mercury. Thus the term *antiseptic*, just like the term intoxicant, does not only include quality but also quantity ; and, as the term is popularly used, arsenic can hardly be called an antiseptic, for then almost every substance which is soluble in water would have to be called so.

M.

CORROSIVE SUBLIMATE AS A GERMICIDE.

Corrosive sublimate being the germicide that is attracting much attention at the present time, we give the following extracts as containing possibly some suggestions to those who are experimenting with this "dead-shot" drug :

"Vigier recommends four or five parts of corrosive sublimate, dissolved in one hundred parts of glycerine, in place of mercurial ointment, for parasites of the skin. It has been known for a long time that glycerine is not absorbed by the skin, and that it also prevents the absorption of medicines, and to a great extent that of corrosive sublimate. Therefore, on account of its greater cleanliness, and greater security from the absorption of mercurials, it is to be preferred to blue ointment."—*Pharmaceutische Centralhalle*, *Phar. Record.*

The *suggestion* in this quotation is in the idea of dissolving the salt in glycerine, it, thus prepared, being less liable to be absorbed ; consequently, a more "heroic" use may be made of it in cases of pyorrhœa alveolaris, etc.

"Kaulich, believing diphtheria to be due to an organism, selects corrosive sublimate as the best germicide to treat this disease. He washes the false membranes of the mouth, nose and throat with a one-twentieth to one-tenth per cent. solution. In children who have undergone tracheotomy, the trachea was washed with the same solution. The application was made four times a day, or sometimes even every two hours. Inhalations of solution of only .005 per 1,000 were used for fifteen minutes every hour or at more extended intervals. Internally he administers to children one to two centigrams (equals about one-sixth to one-third grain) of the drug daily in albuminous water, to which a little cognac and sugar have been added." —*London Med. Record.*

Several gentlemen of our acquaintance are at present engaged in a series of experiments with this drug, endeavoring to decide as to its availability in dental surgery. That it is a sure antiseptic there can be no doubt. "It kills all germ life like lightning" is the remark of one scientist, even with a solution of $\frac{1}{1000}$. So powerful is this drug that great care and much painstaking experimentation must be had before it will be known just where the border-line of safety is. It is, however, used to-day, by both the medical and dental profession, in cases and to an extent that, a short time since, would have caused many men to have held up their hands in "holy horror." From at least two sources, where for some time past examination has been in progress, we have very favorable reports regarding its efficiency in the treatment of "Rigg's disease," and in our next number we hope to be able to present a report in detail by one of our best investigators. In the meantime we shall be glad to hear from any who are using it, or experimenting in this direction.

The question of *antiseptics* has become the "burning question" of the day in the minds of the leading dentists in this country, and one more important and far-reaching can scarcely be conceived of. Investigation has already led to a notable want of confidence in nearly all of the commonly used *so-called* antiseptics, and it is quite remarkable that both the medical and dental professions are so commonly turning their attention to bichloride of mercury or corrosive sublimate.

BROMINE AS A DISINFECTANT.

The vapor of bromine has a very strong disinfecting power, and it penetrates everywhere; but there is a drawback to its use, namely, that it is a liquid which can only be handled by experienced people. To bring it in a more practical form, Dr. A. Frank, of Charlottenburg, near Berlin, has impregnated little sticks, made of compressed siliceous earth, with bromine. The price for fifty of these little sticks, which are sufficient to disinfect a space of about two hundred cubic yards, is only about two dollars. These little sticks lose in a room which one wishes to disinfect slowly their bromine. To protect metallic substances, one has to place a vessel with kerosene near them, the latter absorbing the vapor in its neighborhood.

We give this month, under the heading of Books and Pamphlets, a further notice of Prof. Garretson's *Oral Surgery*, by another of our editors.

STATISTICS OF QUACKERY.

The kingdom of Bavaria has very interesting statistics about a very interesting phenomenon, of which statistics in this country would be almost impossible, namely, the statistics of quackery. The law of Germany is very strict, and one knows very surely who is a quack and who not. Whoever has not gone through the prescribed course of medical instruction and tries to practice medicine or any branch thereof, is a quack. Among the five and one-half millions of inhabitants of the kingdom, were 1,477 quacks in 1882—1,066 men and 411 women. The number of male quacks has decreased in comparison to the previous year by twenty-seven, but the female quacks increased by five. For quite a number of years the number of female quacks is on the increase. This quack-statistic is carried into fine details. With the exception of three, all are native quacks. As to their other calling, the greatest percentage of quacks is among barbers and dentists. Next come small farmers, and finally small traders. Four wives of doctors are set down as quacks, two nuns and eighty parsons, while only eleven teachers have entered that disgraceful business.

A very interesting chapter form the different branches in which quackery is practiced. The greatest number are engaged in general healing. Next come those who prepare patent medicines, then come the harmless homeopaths. There were only four dental quacks in the State. Magnetism and electricity are used only by three quacks, while for boils and abscesses one can consult seventy-three quacks.

Another interesting point, and one that has bearing on the relation of quacks to the education of the masses, is this: The illiteracy in the Catholic provinces of Bavaria is about seven per cent.; in the Protestant, one and one-half. Of all the quacks, there live four-fifths in the Catholic provinces and only one-fifth in the Protestant. The Protestant province of Phals, though in population one-eighth of the whole State, has only one-fiftieth of the number of quacks; thus it may be said that the ignorant and superstitious consult quacks, as compared with the more educated, in the proportion of six to one. Another proof of it may be found in the number of those who consult sympathetic doctors. There is not one of them living in the Protestant provinces (over two-fifths of the State), while 152 are living in the Catholic provinces. How would many of our doctors fare before that tribunal? Well, the graduates of Harvard, Yale, Ann Arbor, University of New York, University of Pennsylvania, etc., would be fully recognized doctors; but graduates from quite a number of other colleges, and the host of ignorant paths would form woeful statistics of good American thoroughness and knowledge. American dentists, as a great mass, would not be considered as quacks; only if, besides practicing dentistry, they should do business in homeopathy or allopathy they would be quacks, and as such punished by law. There exists no law which enables a person to get damage for malpractice, but the government proceeds ex officio against all quacks. Every druggist who would recommend a syrup or a patent medicine would be termed a quack, and be liable to fine. The chief point of difference between quacks and doctors, as maintained also in that country, is that of knowledge. Any man who thoroughly knows his business is not considered a quack; it is only against the pretender that the law is carried out.

BICHLORIDE OF MERCURY AS AN ANTISEPTIC.

Dr. Koch, of Berlin, has made experiments with corrosive sublimate, and finds that its antiseptic effect begins already with a dilution of one to two hundred thousand. In a solution containing only one to five hundred thousand, no germs can any longer exist; a solution of one to twenty thousand destroyed the life of the anthrax germ in ten minutes; in a solution of one to one thousand, sublimate kills germs almost instantly.

BOOKS AND PAMPHLETS.

A SYSTEM OF ORAL SURGERY. By James E. Garretson, M. D., D. D. S. *Fourth edition.*

To tell any dentist who Prof. Garretson is would be an insult to our readers, and we do not doubt that to thousands in the profession the book has and will prove something of a professional Bible. The reputation, experience and opportunities of that author have produced in this fourth edition a work which it is impossible to criticise in detail; every article would deserve special entering into and studying, and we doubt if many in this country would be competent to show greater experience than Dr. Garretson. The introduction to the book is a comprehensive and practical synopsis of the anatomy of the different parts of the face in their osteological, myological, angiological, and neurological relations.

The diseases of the teeth and gums, their treatment, the different points in mechanical and surgical dentistry, occupy almost exactly one-half of the book. For details in the merely microscopical aspect of the teeth and surrounding structures, the book of Heitzmann is more complete; but as the scope of the book of Garretson is more to to give practical hints, details in anatomical points are properly left to books about histology.

We are sorry to see such an illustrious man as Dr. Garretson speaking of the "vice of syphilis;" to him it is not a vice, but a disease, and whether it is vice or not, depends on the peculiar church views he adheres to. The term vice is so arbitrary, and depends so much on the standard we take, that a man of Dr. Garretson's standing certainly used this term only by a slip of the pen. Not the syphilis itself is the vice, but some of the doings which propagate the disease. The term "vice" includes too much of that "holier than you" pharisaism. If a child has syphilis, it only has a disease for *Dr.* Garretson, and not at all a vice, what it might be for *Rev.* Garretson, unless we believe also in medical original sin. One might just as well speak of the vice of peritonitis, because occasionally a crime may be connected with an act that brought about peritonitis; but Dr. Garretson commits an evident confusion of cause and effect when speaking of the vice of syphilis. Many persons have syphilis without having any "vice" connected with it. If there is a "vice of syphilis," then there is also a vice of scrofula, a vice of nervousness, a vice of caries, etc., for more or less all these may be connected with criminal acts.

Every one dislikes to see a man, whom he otherwise deeply respects, in a certain small point illogical and weak; it detracts somewhat from the enjoyment in the man, and mars the favorable impression we get of him otherwise.

A very clear point seems to us to be made by Prof. Garretson in the statement that the child's disease in the line of syphilitic affections is nothing but the continuance of the disease in the parents. But, fortunately, the disease is much rarer, at least in those parts of the United States where the Yankees proper prevail, than where there is a large percentage of French and a mixed population.

We might doubt very much what Dr. Garretson says about the "typh poison." It is to us altogether too crudely chemical, and the fact that a greater number of patients treated with acids during a typhoid epidemic survives than of patients treated with alkalies, seems very little conclusive, taking into consideration how much more palatable even in ordinary health acid drinks and food are than alkaline one, and how much alkali fosters micro-organismal life within the body.

Also the electrical theory of caries receives extensive consideration from Dr. Garretson.

The book is so replete with information that it is perfectly impossible to more than hint its interesting points.

We would hardly value a dentist very highly who would fail to investigate the book closely and carefully. The only excuse we would accept in this case would be that he knew already as much or more than Dr. Garretson.

M.

THE BACTERIA, by Charles S. Boynton, M. D., Rutland, Vt. Read before the Vermont Dental Society, and reprinted from the *New England Journal of Dentistry*. March and April, 1884.

Dr. Boynton quotes Dr. Burrill as recommending aniline violet for staining micro-organisms. It has simply the slight objection that in liquids containing certain salts the aniline violet by itself produces a precipitate which may be confounded with the bacterium. Eosine does not have that objection, or, if at all, in a much smaller degree. It stains the specimens finer and neater than aniline violet, and one is not as liable to overstain them because, even in the most concentrated form, it only gives a slight crimson red.

A great deal of the paper shows the conscientious, careful student, who mentions every line he quotes. The question whether bacteria are animals or plants is so perfectly indifferent that we have occasionally to force ourselves to read such hair-splitting performances as are needed to try to prove one as an animal and the other as a plant, and yet after all to leave us in just as much doubt as before. Hæckel probably did the right thing in calling them protists.

Dr. Boynton lays the greatest importance on the latest investigations in this direction made by Drs. Magitot, Miller and others, which have established so conclusively the action of lower organisms on teeth. It is a pamphlet well worth careful reading. M.

THE ARCHIVES OF DENTISTRY. Successor to the *Missouri Dental Journal*. A Monthly Record of Dental Science and Art. New Series, Vol. I., No. 1. January, 1884.

VULCANITE AND CELLULOID: Instructions in their practical working for dental purposes. By S. Eldred Gilbert, D. D. S. S. S. White Dental Manufacturing Co., Philadelphia.

This seems to be quite a desirable little text-book for its intended object. It is intended especially for students, and will give them all needed information. We regret that it does not more strongly advise the use of plain teeth instead of blocks, as being much more life-like. It is neatly printed and bound, well indexed and illustrated. Every young, and many older practitioners, will find it a valuable book for reference.

RECEIVED:

Transactions of the Illinois State Dental Society: Nineteenth Annual Meeting, 1883.

Transactions of the Dental Society of the State of New York: Fourteenth and Fifteenth Annual Meeting, 1882 and 1883.

Transactions of the American Dental Association, at the Twenty-third annual session, held at Niagara Falls, August, 1883.

Calendar of the University of Michigan for 1883-84.

The Proceeding of the Naval Medical Society, Vol. I., No 6, 1884.

A Consideration of Temperament in Relation to the Teeth, by James W. White, M. D., D. D. S. Reprinted from the *Dental Cosmos*. February, 1884.

A Consideration of the Merits and Claims of Artificial Crown and Bridge Work. J. L. Williams, New Haven, Conn. Reprinted from the *Dental Cosmos*.

Transactions of the Ohio State Dental Society. Eighteenth Annual Meeting, 1883.

SOCIETIES.

The twentieth annual meeting of the Illinois State Dental Society will be held in the Senate Chamber, Springfield, commencing Tuesday, May 13, 1884, continuing four days.

J. W. WASSALL, D. D. S., *Secretary*,
103 State St., Chicago.

The Dental Society of the State of New York will meet at Albany, on Wednesday and Thursday, May 14 and 15. The Board of Censors will meet at the same place, May 13.

J. EDW. LINE, *Secretary*,
Rochester, N. Y.

THE CONN. VALLEY DENTAL SOCIETY

Will hold a two-days' meeting at the Sea View House, Savin Rock, New Haven, Ct., June 18 and 19, 1884. Efforts are in progress which promise an excellent meeting. Information relative to the same may be obtained by applying to the chairman of the Execuive Committee, Dr. George A. Maxfield,Holyoke, Mass., or Dr. W. F. Andrews, Secretary, Springfield, Mass.

VERMONT STATE DENTAL SOCIETY.

The eighth annual meeting of this society was held at St. Albans, March 19 and 20, and the following officers for the ensuing year were chosen: President, Dr. R. M. Chase, Bethel; Vice-Presidents, Drs. G. H. Swift of Manchester, and R. W. Warner of St. Johnsbury; Secretary, Dr. T. Mound, Rutland; Treasurer, Dr. James Lewis, Burlington. Executive Committee, W. H. Munsill, C. F. Lewis, W. S. Curtis. Burlington was selected as the next place for meeting one year hence.

ANNUAL COMMENCEMENT OF THE DENTAL DEPARTMENT OF THE UNIVERSITY OF MARYLAND.

The second annual commencement of this Dental Department, in connection with the seventy-seventh annual session commencement of the Medical Department of the University, was held March 14, 1884, at the Academy of Music, Baltimore, in the presence of a large audience. The degree of Doctor of Dental Surgery was conferred upon the following gentlemen:

Theodore W. Albright, New York; James B. Bigham, South Carolina; Charles B. Blubaugh, M. D., West Virginia; Wilbur C. Bressler, Pennsylvania; Henry H. Boswell, Maryland; John H. Brown, Ohio; George Buttler, Jr., N. Jersey; John M. Comegys, Tennessee; George V. Copp, Virginia; Almond J. Cutting, Massachusetts; Isaac H. Davis, Maryland; Watson E. Dorchester, New York; Richard D. Evans, South Wales, G. B.; Claus Henry Filter, Germany; Nathan E. Foote, New York; Frank C. Gallup, Connecticut; James Edwin Harris, Maryland; S. Dwight Hodge, Vermont; R. Dallas Kibler, Virginia; Wiley S. Killingsworth, South Carolina; Chas. J. Ladson, District of Columbia; Clarence E. Lemley, Virginia; William Edward Lewis, Florida; Job B. Mallott, Pennsylvania; Charles H. McDowell, North Carolina; Semoney J. Minghini, West Virginia; S. Latimer Phillips, Virginia; George Edward Purnell, Maryland; Nelson T. Shields, Texas; A. La Fayette Stratford, North Carolina; Reading B. Swindell, North Carolina; John E. Taggart, Vermont: Robert R. Vaughan, Missouri; Richard van der Hoppe, Austria; Joseph T. Wayman, Virginia; Elmer J. Wisherd, Maryland.

The "University Pledge," relating to empiricism, was assented to by every graduate.

THE NEW YORK ODONTOLOGICAL SOCIETY.

The regular monthly meeting of the New York Odontological Society was held Tuesday evening, April 15, at the residence of Dr. Dwinelle, where members and guests had good cause for satisfaction at being present.

Some interesting incidents of practice were given, and Dr. N. W. Kingsley read an extract from an article on Dentistry, which he is writing for an international medical encyclopedia. The event of the evening was the paper by Dr. J. Smith Dodge, Jr., upon "The Spheroidal Tendency of Amalgam," in which he demonstrated, by the use of well-known geometrical laws, how such tendency may cause the failure of a filling, or, on the other hand, how it might be made use of to improve and perfect the operation. A general discussion very complimentary to Dr. Dodge followed, in which Drs. Bogue, Lord, Clark, Clowse, Francis and Jarvie participated.

Dr. J. Foster Flagg, of Philadelphia, who was to have been present, was detained at home by illness.

D.

A NEW SOCIETY PROPOSED.

To the President and Members of the

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Dental Association.

Gentlemen: The foremost men of our profession admit the fact that the name of American Dentistry has not that world-wide recognition which its honor demands, and its history would warrant. In our opinion, this is an opportune time for a general movement to place it upon a basis commensurate with its dignity, and we venture to submit the outline of a plan for the purpose, which we think feasible, and which we hope will meet with your sanction and furtherance.

As a nation claiming to lead the world in the science and art of Dentistry, we should have one great representative body of the profession to speak forth with authority its aims, duties and attainments.

Let us, therefore, organize a National Dental Association of the United States, composed of delegates elected by the various State organizations, an equal number from each State, to meet annually, and always at Washington, D. C. Thus, we would give to Delaware the same voice as to New York. In order to always secure a full meeting, we would suggest six as the number of delegates from each State; a like number of alternates having been elected. Let the National Association elect a Board of Regents, one from each State, who shall control its meetings, setting the time, etc.

As important adjuncts to this Association, we believe it would be found expedient to establish an extensive library, to contain dental works and publications, standard and periodical, foreign and native;

and the founding of a national museum, to illustrate the past, present and future of dentistry.

The wonderful benefit to the profession and humanity in general to be derived from these is certainly manifest to every intelligent dentist.

We are sure that room can be obtained in the Smithsonian Institute for the museum, and in the library of the Surgeon General's office for the library. We are equally sure that Congress will grant an appropriation for both purposes, as is done for the medical profession.

Mature deliberation at the meeting for organizing will suggest the details of the scheme, which we have not thought it necessary to go into here.

In conclusion, we would respectfully urge that you elect, at your present meeting, delegates, with alternates, to meet for the purpose of organization at the time agreed upon by the chairmen of the different State delegations.

Do this in anticipation of like action upon the part of other State societies; then forward to Dr. B. H. Catching, Atlanta, Ga., the name and address of your chairman, and he will act as medium of communication between the different delegations, informing each of the action of the other, thereby bringing about unity of action.

Yours respectfully,

FRANK ABBOTT, New York City.
J. E. CRAVENS, Indianapolis, Ind.
C. T. STOCKWELL, Springfield, Mass.
F. SEARLE, Springfield, Mass.
W. C. WARDLAW, Augusta, Ga.
B. H. CATCHING, Atlanta, Ga.

We are informed that the response to this address is very cordial and hearty from all parts of the United States, and that there is scarcely a doubt that the plan will substantially be carried out. It seems to us to be desirable, and that it need in no way interfere with other existing societies but, rather, that it may be a very valuable supplement to such and a decided advantage to the profession.—ED.

Philadelphia Dental College

AND

HOSPITAL OF ORAL SURGERY.

Copies of Announcement, affording all information as to this Institution, are to be obtained by addressing

Dr. J. E. Garretson, 1537 Chestnut St., Philadelphia, Pa.

THE

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ORIGINAL COMMUNICATIONS.

ON THE INFLUENCE OF MICRO-ORGANISMS IN THE PRODUCTION OF CARIES.

BY ARTHUR S. UNDERWOOD, M. R. C. S., AND L. D. S., Eng.,

Lecturer on Dental Anatomy and Physiology at the Dental Hospital of London Medical School, etc.*

[Read before the Odontological Society of Great Britain, April 7, 1884.]

Mr. President and Gentlemen:

Mr. Milles and myself have so much to lay before you to-night in the form of evidence concerning the part played by micro-organisms in the production of caries, that we feel confident you will excuse us if we go straight to the matter in hand without an unnecessary waste of time in the form of preamble.

It is, however, necessary to state that we only propose to discuss the purely pathological side of the question to-night, and that only so far as the dentine alone is affected.

As we stated in 1881, we still consider that the initial stage, that is, the enamel destruction, is probably little more than a chemical

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*By the courtesy of the author, and with the special permission of the Society, we are furnished with corrected proof-sheets of the *Transactions of the Odontological Society of Great Britain*, for April, containing the above paper. The discussion that followed the reading of this paper we hope to give in our next number.—Ed.

solution of the tissue by an acid or acids; but we are inclined to believe that the greater part of such acids are the result of fermentation, a process which is entirely dependent upon micro-organic life, as has been amply proved by Pasteur, Lister, and others.

As the result of the decomposition of albumenoids, numerous substances are formed in the mouth—peptones and other similar bodies, fatty acids, acetic, formic, butyric, malic, lactic acid, &c., and in some cases sulphuretted hydrogen and ammonia are produced in large quantities. This decomposition is directly produced by the vegetation of micro-organisms.

A very simple illustration of this fact is obtained by filling two bottles with neutral saliva and bread, and rendering one aseptic, either by adding carbolic acid or boiling, or any other process of the kind. The micro-organic growth which will take place in the impure one will produce a large quantity of acid; the pure one will remain neutral. The most constant source of an acid reaction in the mouth is undoubtedly micro-organic fermentation.

This is not, however, the main subject of to-day's paper, and therefore we shall content ourselves with this passing allusion to it.

We cannot, however, refrain from expressing our gratification at the careful attention this subject has received from the profession, both here, in America, and on the Continent. Professor Mayr has worked out the chemical aspect of the question with great care and exactness; Mr. Tomes has done much in the direction of the effects of organisms in the soft tissues of the teeth; Mr. Spence Bate has given us many valuable suggestions in his able and exhaustive summary of dental science at Plymouth last year; Mr. Sewill has thrown out valuable conjectures upon the remote etiology of caries; and Dr. Miller, of Berlin, has done an immense amount of microscopical work, contributing a large array of evidence.

We have not been able until now to present our own views in full, because many of our experiments required a long time to verify and confirm; some afforded perplexing and almost contradictory results, requiring a long time to clear up and involving much repetition, and we may add, in explanation of the apparent delay, that what takes but little time to write or say often requires months and years of disappointment and patience to work out.

In the autumn of 1881 we were only justified in speaking with any amount of positiveness upon one point, namely, the actual presence of micro-organisms in carious dentine. This one fact, and the evidence in support of it, formed the body of the paper we ventured to present to the International Congress. Micro-organisms were found in every fragment of carious dentine of which we cut sections, and we had cut immense numbers; the leptothrix of Leber and Rottenstein was, we found, a superficial growth.

Another fact of scarcely less importance, but one supported by far less evidence, was that the agencies to whose action caries had up till then been attributed by a large majority of scientific opinions, namely, certain acids, were unable to produce any such changes upon teeth exposed to their action alone, although the enamel protection was removed, and the acids employed were those present in the mouth. We had read many allusions to caries produced in teeth out of the mouth by artificial means; we employed the means indicated (whenever they were indicated, which was rarely), with the addition that we did so under absolutely aseptic conditions; we repeated the experiments, and the result of (in some cases) years of exposure was that no change that we could detect took place. Here was a second, but a negative fact.

The third fact obviously required was a positive one: it remained to inoculate dental micro-organisms into the flasks and observe the result. We did so, and the result was change in the exposed dentine, but so slight that we could not succeed in cutting a section; still, at the time of our paper of 1881, we firmly believed this change, when allowed to become more intense, would prove to be caries. Of the third fact we felt bound, however, to speak very cautiously, and for the last two and a half years we have employed every means in our power to clear it up—with what result we shall endeavor to make plain to you to-night.

We are anxious that you should keep clearly before you four main issues, upon which all the theory which we suggested to you in 1881 depends.

1. That certain forms of micro-organisms, namely, micrococci, rod-shaped oval bacteria, and short bacilli are invariably present in carious dentine.

2. That these micro-organisms extend into the tissue as far as does the caries.

3. That no agents can be made to produce a change resembling caries in the absence of such micro-organisms, i.e., under aseptic conditions.

4. That under septic conditions a change can be induced which,

although we are not prepared to call caries, does in some particulars resemble it; teeth in which this change has been produced we shall submit to you to-night, and also suggest to you why we hesitate to call it caries.

These four points once established upon reasonable evidence, we shall ask you to consider whether we are not justified in deducing from them the conclusion that micro-organisms play an important part in the production of the disease as we see it and are called upon to treat it, and that their active presence is an absolute essential to its production.

We may add, incidentally, that we never suggested that no other agency assisted in the process, although a recent writer attributes some such absurdity to the advocates of the germ theory. We do not consider ourselves justified in wasting your time over such a digression. The first point to discuss, then, is the constant presence of micro-organisms in carious dentine. Upon this point the evidence submitted to the profession by us in 1881 was very strong. We were then able to state that, since we had succeeded in properly cutting and staining sections, we had always discovered micro-organisms. The appearance was not caused by softening agents, because the teeth were cut fresh and immediately after extraction. The number of sections cut by us between 1879 and 1881 was so great that we were convinced that the phenomenon was constant.

Since then, Mr. Charles Tomes has, we believe, made some investigations which have led him to concur in this constant presence.

Dr. Miller, of Berlin, has cut a very large number of sections of carious dentine, with a result which is completely confirmatory of our assertion that micro-organisms are invariably present. In fact, this point has been confirmed by every careful observer, and may be considered to be completely established.

The second point is one very much more difficult to decide—the more so because statements have been made upon this point which tend very much to confuse the mind of the reader. It has been stated by Dr. Miller, who has written a very large number of papers upon this and kindred subjects during the last two years, that there is a zone of softened dentine of considerable width, not affected with micro-organisms, separating the normal dentine from that which is so infected; and further, that the outline of this area of softened dentine does not correspond with the outline of the area infected with organisms. We have attempted to verify this observation, but we have arrived at the conclusion that if there be any such zone at all we cannot believe it to be of any considerable depth, as we have not succeeded in finding any softened tissue that did not contain micro-organisms. Having regard, however, to Dr. Miller's reputation as a careful and conscientious explorer, we do not desire to attach too much weight to negative evidence; later on we shall suggest some weighty positive evidence on this point. With regard to the outline, we have invariably found the outline of the changed tissue to correspond with that occupied by micro-organisms, and we feel less hesitation in doubting this latter statement of Dr. Miller because he claims to be able to compare these outlines with the naked eye, unaided by any instrument. We think that this is too rough a test for objects whose greatest measurement does not exceed the $\frac{1}{10000}$ of an inch.

There is no doubt that it is easy to establish a line of demarcation with the aid of a sharp instrument between tissue that you can easily prick and that which is quite hard; this line no doubt corresponds very nearly to the edge of the disease. We have also come to the conclusion that it corresponds very nearly to the edge of the micro-organic invasion; that is, we have cut sections as near as we could to the healthy tissue and found them infected. We do not, however, attach so much weight to this fact as to the following experiment, which we think must be allowed to be absolutely conclusive.

Before we can explain its full weight we must enter into a few details of the method we employ to grow and cultivate special germs. We used to make a meat infusion, boil it, introduce it with antiseptic precautions into aseptic test tubes, and seal the tube with wool. If the fluid remained clear we knew it was pure; if it became turbid within a day or two we knew our precautions had not been complete, and some germs had been introduced accidentally, and the tube was of course useless. If we wished to grow a special germ we rubbed a purified probe against the infected spot, and introduced it into the fluid, replaced the wool cap, and the ensuing turbidity denoted the growth of the germ. The objection to this plan was that the turbidity spread through the entire fluid; and if we had, despite our precautions, introduced any other organisms besides those we specially intended to introduce, they all became inextricably mixed in the ensuing putrefaction. To obviate this, we adopted Koch's plan of adding gelatine, and instead of a pure fluid, making a pure jelly; when this was inoculated in a particular spot the growth was confined to that spot, and if anything else dropped on the surface of the jelly it grew there quite separate. Under these circumstances we noticed that different forms of germ grew in quite different ways—some, for instance, forming a white ball, others a mass of spiculæ, others wavy lines; these peculiarities of growth could be easily reproduced in other flasks by a second inoculation, until we found it quite easy to separate each variety and grow it by itself without any extraneous growth to confuse the result. We have brought down some flasks, with growth going on, to show you to-night. Well, we proceeded to inoculate flasks with those deepest portions of softened tissue which formed the most outlying layer of changed dentine, and we found that from these portions a growth of organisms proceeded, proving beyond doubt that organisms were contained in the pieces inoculated. This is not a doubtful experiment; it absolutely demonstrates that the deepest portions of the softened tissue contained organisms, and if there exist any zone of alteration beyond them it is so microscopically narrow that we have not been able to detach a fragment of it.

We do not, however, deny that there is a great probability that the advance guard of micro-organisms may be surrounded, and, *to a microscopical extent only*, preceded by a softening, the result of the action of those acids which they themselves produce. We shall be able to show that they do generate acids capable of softening dentine, and therefore we should expect to find this effect slightly in advance of their presence; but this is hypothesis merely. We would further add that the transition from very carious tissue to that which seems quite healthy to the eye and the touch is, in the greater number of cases, more sudden than is generally supposed, and allows but little space for this non-infected zone. To convince oneself of this, it is only necessary to split a number of carious teeth and prick the surfaces. One more fact should be borne in mind in this connection, namely, that healthy dentine softened by a weak acid does not look different under the microscope from healthy dentine cut fresh, and it is therefore impossible to detect the softening microscopically; the tubes are not larger, nor are they irregular, as is the case in carious dentine—in fact, the existence of such a softened and uninfected zone separating the infected from the non-infected dentine is a matter so difficult to demonstrate that we do not think much value is to be attached to it.

We now come to the third point, viz: that it is not possible to produce caries, or anything resembling it, by subjecting teeth to the action of acid fluids, in flasks out of the mouth, provided the flasks be kept in a strictly aseptic condition. We do not think this point has ever been disputed, and we feel in position to state that the evidence upon which it rests is incontrovertible; but, before discussing it, and the point that follows it, we think it will not be a waste of time to explain what we mean by a change resembling caries. We mean a change by which the tissue affected is made distinguishable from that which is normal to the naked eye and touch or under the microscope. To the naked eye it must become discolored—we only mean changed in color, and not necessarily brown; the surface loses its polish, or, if moist, the affected part must be separable from the healthy with an instrument; to the touch it must become softer; under the microscope the channels must become dilated at the expense of the matrix. In 1881 we exhibited several flasks in which infusions of meat and saliva containing malic, butyric and other acids had been allowed to act upon exposed dentine for periods varying from one to three years; the teeth were liable to caries because they had suffered already from it; healthy portions were denuded of enamel and partially protected by wax, a certain part being left exposed with no perceptible result whatever. Of course a strong acid, or a large amount of acid, would decalcify the tooth, but this does not resemble carious change.

These experiments were sufficiently numerous and conclusive to warrant us in passing on to the fourth point of this investigation, and this will detain us longer than any of the others, as it is in this direction that we have experienced the greatest difficulty and the most perplexing results.

We were so fully alive to the overwhelming difficulties attending any attempt to reproduce out of the mouth the complicated conditions existing therein, that we should have felt anything but sanguine but for a curious accident that encouraged us to proceed in this direction. We will therefore commence by telling you the particulars of this accident.

At the Congress in August, 1881, we exhibited, among other flasks, a series intended to illustrate the fact that no change resembling caries could be induced upon the surfaces of teeth under aseptic conditions. These flasks all contained an infusion of meat and saliva with malic and butyric acid and teeth susceptible of caries, the surfaces ground down to expose the dentine, part of the exposed surface being protected with wax, so that any loss of substance could be at once detected in the exposed part. Now these flasks, which were labeled i, iii, iv, v, vi, had remained perfectly pure from the time they were put up, June, 1880, till the Congress, August, 1881, that is, fourteen months, and no visible change had taken place in the exposed surfaces. In taking them home in a bag, flasks i, iv, and v fell down, allowing the fluid to come in contact with the cap covering the flasks; iii and vi remained upright.

In the course of a few days, flasks i, iv and v, which had tumbled down, became turbid; iii and vi remained, of course, pure. By the 5th of December, 1881, iii and vi were to all appearances, as before, unaltered; but the teeth in i, iv, and v were already discolored brown; moreover, the discolored parts were on the surfaces slightly softened, and although the change was so shallow that we could not obtain a good thin section of it, we could see that the tubes were enlarged and contained a material that stained readily, which, owing to the thickness of the section, we could not, unfortunately, identify. Now, whatever this change was, it was manifestly dependent upon the introduction of organisms; nothing else was introduced. Fourteen months' immersion in the fluid, when aseptic, failed to change the teeth at all; four months in the same fluid, plus germs, produced a change; the same additional four months, in the sister flasks, produced no change at all. This seemed an important addition to the facts in our possession at the Congress. The next stage was less satisfactory; the change did not seem to progress; do what we would, we could not produce a considerable change. We conceived that this might arise from the fact that several important conditions favorable to the activity of the germs in the mouth were absent in the flask. First, the temperature of the body; second, opportunities for lodgment; third, constant renewal; fourth, unlimited and varied pabulum; we therefore contrived a very elaborate experiment in which we proposed to assemble all these conditions, and as many more as we could think of. We erected a large incubator, which we kept continually at the temperature of the human mouth; it was divided into an upper and a lower story, which communicated by an aperture. In the upper story was a small bath with a tiny tap contrived to drip drop by drop through the aperture into a second bath in the chamber below; this again dripped into a receiver, the fluid being thus kept in constant circulation through the middle bath. In this middle bath were placed some teeth set side by side as in nature, the roots being implanted in a block of hippopotamus ivory, and weak points created in the interstitial parts with the burring engine, the size of the burr being kept to test any enlargement of the holes, and some others implanted in wax. The upper bath was then filled with saliva, milk, bread, decaying teeth, meat, etc.; while some fragments of the latter were inserted about the teeth in the middle bath. The lowest receptacle was periodically emptied, while the top one was periodically fed. Without troubling you with more details, we thus contrived to assemble the proper temperature, the pabulum movement, and the normal disposition of the teeth. Now six months of this highly unsavory experiment produced scarcely any perceptible change, except that all the tissues became black, the holes drilled in the blocks and in the teeth were the same size, and their edges were not a bit softened. The putridity of the baths was, however, so offensive, that it was with some relief that we decided to abandon this particular experiment. We saw that some great essential condition was absent, and though a longer period might doubtless have produced slight changes, my health and appetite suffered from the constant exposure to all these putrid smells, and we agreed to stop the incubator; but this experiment, though apparently a failure, led us to what we conceive to be the true solution of the difficulty. So far we had decided only that some essential factor had been omitted.

The next experiment we shall describe is a repetition of one described by Dr. Miller, with this extension, that it has been carried out under septic and aseptic conditions. Two 8-oz. bottles were half filled with saliva; to this was added bread in both cases, and in one carbolic acid; into these were introduced fragments of healthy teeth extracted for regulation and split. The saliva was the same—i.e., from the same mouth—and taken at the same time, the bread from the same piece, the teeth were halves of the same tooth; both fluids were neutral. The bottle not containing carbolic speedily became the scene of an active growth of micro-organisms, for the greater part micrococci; a thick felt of this growth formed at the surface of the fluid. At the end of three months the surfaces of the teeth in the impure flask had become softened, but not discolored; the surface of those in the pure flask was unaltered, the fluid in the pure flask was neutral, that in the impure one strongly acid. Thus in the impure flask acids were generated as well as germs, or, as we think seems more rationally to express it, by the germs. The teeth from these fluids are here for your inspection. Lastly, a number of teeth are here for your inspection in which a change has certainly taken place after a long immersion in septic fluids.

It is plain, then, that whereas in the absence of germs no change takes place that could be supposed to be caries, and that in the presence of germs a change does take place, which, although it would render our views more cut and dried to call caries, we are bound to confess is a very weak caries if it be caries at all; and further, remembering that unmistakable caries does affect natural teeth on artificial dentures which have no connection with the vascular system, we are led to inquire whether organisms, that are undoubtedly the prime factors in the production of other diseases, afford us any analogy of a loss of power when placed in strange conditions. The answer to this inquiry is very plain and direct, and completely in the affirmative.

Pasteur, Naegali, and other equally reliable authorities, have discovered that special organisms alter their character when grown under unusual conditions. Even though they continue to grow and reproduce their species, their special properties weaken and die out in the unnatural surroundings. Thus, to take a couple of typical instances, Pasteur, by growing bacillus anthracis at a peculiar temperature, "attenuated" the organism to such an extent that he was able to vaccinate animals with it—that is, he rendered this special bacillus, which, in its normal condition, would, if inoculated into an animal, produce anthrax, practically inocuous by changing its surrounding conditions. Again, Naegali has been able so to modify the properties of a lactic acid producing bacterium that it produced an ammoniacal fermentation. Lastly, certain pathogenic bacteria require a special soil in which to grow and a special temperature, otherwise the growth ceases altogether. Moreover, the presence of a number of extraneous organisms does in some cases hinder the active growth of others. A similar difficulty has attended the attempt to grow the organisms of gonorrheal ophthalmia, and such instances may be almost indefinitely multiplied; the conclusion is, however, pretty plain, namely, that special organisms require special surroundings to display their special activity, and we are inclined to think that in the case of the micro-organism of caries a living mucous membrane is one of those conditions.

In view of these facts, we feel ourselves justified in claiming to have established as a permanent addition to dental pathology the fact that micro-organisms of a special form do play an important part—nay, more, that they are an essential factor in the production of caries. We think many of these experiments show that these organisms do much of the work—at any rate, as far as the removal of the lime-salts goes—by the aid of an acid which they produce. We feel convinced that the process, to be effective, must be carried on in a living mouth, probably because that is the only situation in which the special germs are really active. Analogy seems to warrant this deduction; but, before concluding, we wish to impress upon the meeting, and through the meeting upon all who take an interest in the matter, that all we claim for the germs is, that without them and their products the process could not go on at all. The essential element that was not present in our artificial experiments is present in the mouth; it is possible, and we consider from the analogies quoted above, *probable*, that this important element is the living buccal mucous membrane as a scene of operations, and the constant succession of the proper germs. Enough has, however, been laid before you to induce us to hope that this Society will indorse the statement made by us in the August of 1881, and repeated more fully now, that micro-organisms play an important part in the production of caries, and that the dental pathology of the future must include them among the most powerful factors in the production of this disease.

We have only, in conclusion, to thank you, gentlemen, for your kind attention, and to leave the question in your hands for discussion.

A HISTORY OF DENTISTRY.

BY GEORGE H. PERINE, D. D. S., NEW YORK.

[Continued from page 274.]

THE PROFESSIONAL ADVANCEMENT IN THIS COUNTRY.

The wonderful advancement made in this country in every art and science within that brief space occupying the interval between the opening of the nineteenth century and the present time, has caused the eyes of the old world to turn toward us in astonishment, and the history of this age generations hence will appear to the reader more like an Arabian Nights' tale than a statement of sober truth. Dentistry has more than kept pace with the other arts and sciences in their advancement toward perfection. The first step in her upward journey at the opening of this century was, we consider, the publication in Baltimore, in 1801, of a treatise on the teeth, by Dr. R. Renner, a practitioner in that city, which is generally believed to have been the first upon the subject published in this country. Following closely upon Renner's little work, came one from the pen of Dr. B. T. Longbotham, also a Baltimore dentist. The object of this work was to enlighten the public regarding the importance of dental treatment, and in it the writer advanced new theories as to the cause of diseases of the teeth and gums. To the life and labors of the distinguished men of which we will speak, the history of our profession in this country is largely indebted. Bringing to its aid minds of extraordinary culture and capability for skill, their influence was deeply felt and gave importance and respect which was widely extended to our then neglected science.

JOHN RANDALL was born in Massachusetts in 1773. He graduated from Harvard University and commenced practice in Boston about 1805; he was induced to undertake the study of dental surgery during his college career, through the ignorance displayed regarding that important branch of medical science, by a prominent medical man. When Randall began practicing, dental operations consisted almost entirely in the extraction of teeth, and the introduction of artificial dentures, little or no attention being paid to the treatment of diseases of the mouth. The number of practitioners who deemed the preservation of the teeth a subject worthy of their consideration was exceedingly limited. Randall, adopting the theory that there is no disease without a remedy, applied himself to the task of discovering a proper mode of treatment for diseases of the gums and carious teeth. By perseverance and study, he became proficient in the dental art, which he practiced in connection with the science of medicine. He was particularly successful, and his active professional labors covered a period of over forty years. He died in 1843.

To give the reader an idea of the crude state of the profession, or at least the limited knowledge possessed by some of those who undertook its practice, we may call attention to

LEONARD KOECKER, a German, who began practice in Baltimore in 1807. With a few instruments and an abundance of assurance, he made known his intentions. His first operation was the extraction of a tooth which he performed with closed eyes and palpitating heart, very much after the manner of a boy making his first shot with a gun. It is recorded that the patient survived. Koecker, after something of a struggle, met with success, and gained a high reputation as an able and skillful dentist. From necessity, he made many of his instruments and annealed his own gold foil. Leonard Koecker was born at Bremen, in 1785, and while still young he came to this country. In 1822 he returned to Europe and settled in London. Between 1826 and 1835 he published works on Dental Surgery, Artificial Dentures, etc. His death occurred in London, August 8, 1851.

Benjamin James was in successful practice in Boston about this time. He was a man of somewhat exclusive habits. In 1814 he published "A Treatise on the Management of the Teeth."

It was in the year 1816 that John A. Szymanski came to the United States, and located in Philadelphia. He afterwards traveled over the States, and practiced in many places with success, and did much to advance the specialty in this country. He was born at Warsaw, Poland, in 1793; graduated in medicine at Dantzic, and in 1814 commenced practice. He went to Sweden, and entered the hospital at Gottenburg, where he remained for a time; thence to England, and devoted his attention exclusively to dentistry. Dr. Szymanski possessed a thorough scientific knowledge of his profession, and was a gentleman of fine education, courtesy and polished bearing. His death occurred in January, 1829.

A. A. **Plantan** came to this country from France, about 1817, and settled in Philadelphia, where he began practice. He was a man of fine education and brilliant attainments. His interest in the advancement of the specialty was marked, and his improvements many. He was the first to introduce and manufacture porcelain teeth in this country. He was born in 1774, and died in the sixty-fifth year of his age.

About this period, Levi S. Parmly, the oldest of the five brothers, four of whom became dentists, had gained considerable prominence in Boston as a dental practitioner. He was a student under Dr. Petrie, an English dentist, in 1812, and, being a man of superior talents, gained for himself a high professional reputation. In 1815 he went to Montreal, and thence to Quebec, where he practiced for some time; from Canada he returned to the United States, and tarried for a period in the West and South. Later, he made his way to London, where he practiced for a few years. In 1819 he published a work entitled "A Practical Guide to the Management of the Teeth." In 1821 Dr. Parmly delivered lectures in this country on "The Natural History and Management of the Teeth," the causes of their decay, etc., and was also the preceptor of several, who afterwards became quite eminent as practitioners, among whom was a younger brother, Dr. Eleazar Parmly. In 1845 Dr. Parmly presented to the profession a valuable paper on Dental Hygiene, which attracted considerable attention. Dr. Parmly returned to Europe, settled in France, and died in Versailles, July 8, 1859. His remains were brought to this country, and interred at Perry, Ohio, August 29, of the same year, that being the seventieth anniversary of his birthday.

The effort made by active members of the profession to induce the public to realize the importance of dental treatment began at length to produce in a measure the desired effect, and practitioners who had hitherto remained inactive awoke to a sense of duty, and soon began to assist in every way in their power toward the advancement of professional interests, and "Observations on the Teeth," a small work was published in 1820, by Dr. Essevein of Charleston, S. C., and a second edition of the same work somewhat enlarged appeared a few years later.

In 1824 Dr. Elazar Gedney, who had acquired a high reputation for skillful practice, both in this country and in England, published in Utica, N. Y., where he was then located, a small book bearing the title, "The Human Teeth." Gedney's successor in Utica was Dr. A. Blakesley, a skillful dentist, who for years retained the confidence of the community in which he resided.

About this time the number of dental practitioners in the United States did not exceed one hundred, and this number included Dr. John Trenor, of New York (who in 1823 contributed to professional literature a paper on the Teething of Infants, and in 1828 presented his "Physiological Inquiry into the Structure, Organization and Nourishment of the Human Teeth," and a year later his "Observations on Neuralgia" appeared, also "Remarks on Dental Education"); and Dr. Samuel S. Fitch, of New York (author of "A System of Dental Surgery," a valuable work of reference, published in New York, 1829, the second edition of which was published in Philadelphia, in 1835, whither the writer had removed).

With each succeeding year the number of the specialty rapidly increased, and with this augmentation naturally came increased knowledge and enlightenment, and a desire on the part of the people for proper dental care so greatly increased the demand for the services of skillful practitioners that many were accustomed to migrate into the rural districts, or make periodical visits to neighboring, and in some instances distant cities.

Among these itinerants of worthy professional reputation were Drs. Brewster and Cleveland, Ambler of South Carolina, Hayden and Harris of Maryland, Brown and Hale of Missouri, McReynolds of Georgia, Badger of Tennessee, Hullihen of Virginia, Flagg and Townsend of Pennsylvania, Keep and Miller of Massachusetts, Taylor of Kentucky, Baker and Parmly and Solyman Brown of New York. The latter, who contributed somewhat liberally to dental literature, will doubtless be remembered by many of the old residents of Long Island, from the fact of his traveling from place to place in considerable state with his chariot and pair, and there is no reason to doubt that a few traces of his skill still remain, reminders of the days when dentistry was little thought of in the rural districts until its missionaries, so to speak, brought it to the very doors of the people, and thus gave them an insight into the benefits it was destined to bestow upon mankind. Not all, however, of those who made professional pastoral pilgrimages left behind them enduring traces of their skill; but often, quite to the contrary, fractured jaws and partly extracted teeth impressed upon the mind of the unfortunate patient a recollection which years could not remove, and ever after caused the sight of a dentist's *modest sign, in the shape of a somewhat exaggerated gilded tooth,* to produce convulsions of an alarming character. Perhaps the following anecdote, which may be somewhat embellished, but which will give the reader a fair idea of the character and skill of some of the itinerant so-called dentists of the early days of the profession, may prove interesting:

To a certain small hamlet, in the days before railway tracks intersected each other in all parts of the country, like the network of telegraph wires hung in the air like spiders' webs on a summer morning, there came with staff in hand and kit on back a youth who, through the medium of a circular couched in questionable English, announced his willingness to perform for a moderate fee all manner of dental operations, from the extraction of a deciduous incisor to the insertion of artificial dentures likely to cause Dame Nature to blush at her inefficiency in her dental efforts. Several simple operations performed with comparative success were instrumental in procuring for our disciple of Wooffendale a desirable patient in the form of a well-to-do but rather intemperate farmer, whose upper teeth were entirely gone, and who gave our knight of the forceps an order to supply their place with an artificial set, which were accordingly constructed and inserted, and the practitioner, having received his fee, buckled on his kit and set out for the next town. The distance being something like thirty miles, he was obliged to pass a night at a wayside tavern where, the next morning, he was at an early hour called upon by his late patron. "Look a here," shouted the irate tiller of the soil, confronting the astonished tooth manipulator, "what do yer take me fer, anyhow—a huskin' machine? Look at this 'ere corncob what you put inter my mouth yesterday; there ain't a kernel left on the infernal thing," and the indignant rustic produced the bone base from which every tooth had disappeared. "Good heavens!" exclaimed the professional gentleman, in apparent astonishment, and then, as if seized with a sudden thought, he inquired, "what did you eat after those teeth were put into your mouth?"

"Mush and milk," replied the farmer.

"And what did you drink?"

"Apple brandy," was the reply.

"That accounts for it," exclaimed the practitioner, impressively. "You see, sir, the teeth I made you were attached to a base composed of hippopotamus ivory. Now, sir, you must understand that the hippopotamus is an animal which lives a greater part of the time in the water. In the temperance sense it is totally an abstemious animal, and when the fiery beverage you are accustomed to came in contact with the fragment of the animal's anatomy, to which your artificial teeth were attached, the shock was great, and actually produced so decided a shock among the nerves contained in the bone that the teeth were dislodged from their setting."

If not satisfied with our friend's explanation, it is safe to conjecture that the farmer withdrew from the presence of his dentist somewhat mystified.

[To be continued.]

GRANULATED BONE AS AN ARTICLE OF DENTAL HYGIENE.

BY H. E. DENNETT, D. D. S., BOSTON, MASS.

In the discharge of their duties, the physician and dentist are daily asked by their patients, "What shall I do to prevent my teeth from decaying?" The answer must be, "Correct your diet." That is, eat such food and only such as contains all its natural elements. If we eat the products of grain, we should eat it with all its elements as furnished by nature. If we eat meat, we must eat bones, or our systems will suffer from this violation of one of nature's unerring laws. Dental development in man is discernible as early as the seventh week of intra-uterine life; hence, the importance of a strictly correct diet from the start, if mothers desire to give birth to children who may have perfectly formed teeth. The same dietetic rule will secure the foundation for a good bony framework. A mother who passes through the periods of gestation and lactation without a sufficient amount of bone and tooth element in her food will suffer from decay of the teeth, accompanied with the usual pain and suffering in proportion to the extent of the deficiency. The lime will be dissolved from her teeth, taken into the circulation and appropriated by the offspring. Excepting civilized man, all flesh-eating animals eat as much of the bone of the animal they devour as they can break with their teeth sufficiently fine to swallow, and all have good dental organs. Place before a tribe of Indians everything the earth produces in the shape of food and they will eat only animal food as long as that lasts; but place them upon a reservation, and feed them as civilized people feed themselves, and they too soon suffer from decay of the teeth. Take from either of the above classes their supply of bone which they can get with their animal food and decay of the teeth is sure to follow. Even our domestic herbivorous animals thrive better by having bone added to their bill of fare.

The cow which every year gives birth to young has an excessive drain upon her for bone material, and craves bone to such an extent that she will even try to masticate large ones, as every farmer's boy can testify.

Veterinary surgeons have long known that certain diseases of their dumb patients can only be successfully treated by giving them bone meal.

Persons engaged in raising poultry know that their birds must have lime supplied to them or they will furnish only soft-shelled eggs. Bone is now acknowledged to be the best fertilizer for New England farms. Visit one of these farms in the month of June, and you can count the hills half a mile away where the corn grew three years before by the spots of grass which stud the earth at regular intervals. The farmer will tell you that "bone did it." The evident deficiency in the soil explains the too apparent lack in the products of the soil.

Arguments in favor of eating bone to prevent decay of the teeth, as well as to cure a long catalogue of bone and kindred diseases, might be continued indefinitely; but, as "A word to the wise is sufficient," it seems only necessary to add that the results obtained from an experiment, long continued, upon an entire family, were such as fully to establish its beneficial effect.

The bones used were selected from perfectly healthy animals, none being accepted that bore the slightest blemish, carefully cured, without being allowed to pass through any perceptible chemical changes, finely granulated and incorporated into soups, gravies, bread, etc., in the proportion of from one to three spoonfuls with each pint of gravy, soup or flour.

The relative proportion of nutritive elements in one hundred parts of different kinds of animal food have been found as follows: Beef, 26; mutton, 29; pork, 24; chicken, 27; codfish, 21; blood, 21; brain, 20; white of egg, 14; milk, 7; bone, 51.

EDITORIAL.

NITROUS OXIDE.

Speaking of this agent, the *London Morning Post* fears that the growing practice, especially among dentists, of administering it single handed, will be productive of mischief, and will tend to discredit its employment, even in a proper fashion, and it doubts "whether the theory and practice of this and other anæsthetics is sufficiently taught in our medical schools. A special certificate from an expert is required to qualify a medical practitioner for performing the very simple operation of vaccination; and it might be well to apply at least an equal test to the student's knowledge of the art of sending his patient to the realms of happy unconsciousness, and, what is more, of bringing him back again."

A SIMPLE OPERATION IN FACIAL NEURALGIA.

Under this designation, Dr. Heustis, Professor of Surgery in the Alabama Medical College, describes an operation which he performed on a gentlemen above seventy, who was in good health in all other respects, except that he suffered from severe facial neuralgia, affecting both the infra and supra-orbital nerves. As the patient had become much weakened by the severity of the pain and his inability to eat his food, it was deemed desirable to render an operation performed upon the infra-orbital as simple as possible, consistently with its efficiency. "Therefore, discarding Carnochan's operation of trephining the antrum, and following up the nerve beneath the orbit and removing it, and Langeubeck's slighter one of dividing the nerve with a tenotome, and drawing it out through the infra-orbital foramen, I merely cut down upon the foramen, and with a fine steel drill, such as dentists use, improvised of piano wire, drilled out the nerve in its entire length, as far back as the sphero-maxillary fissure." The relief obtained was immediate and complete, and had so continued two months after the operation.—*Philadelphia Medical News.*

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We are pleased to learn that Dr. W. D. Miller, of Berlin, may be expected in this country before many weeks. His native land will extend to him a warm welcome, surely.

MEETING OF THE NEW YORK DENTAL SOCIETY.

It was a very pleasant privilege of ours to attend the annual meeting of the New York Dental Society, which was held at Albany, May 14 and 15, and we regret that our space will only allow a brief notice thereof. For very many courtesies shown us we are profoundly grateful. Judging by the character of the two sessions we attended, the meeting must have been one of much importance and interest. Many of the papers were of high character and will make an impression upon the dental world far beyond the limits of the New York Society: Notably those by Drs. Miller and Abbott, the latter being the "prize essay" of this year.

Dr. Miller's paper was a culmination of his long series of papers, and is a scientific thesis on the most prominent question that at present occupies the minds of the dental profession, namely, Antiseptics. We shall take great pleasure in giving our readers this paper in our next number.

The report of the entire proceedings of this meeting may be looked for with interest, and we trust that the Society will delay the issuing of this report for as little time as possible.

Among the several matters of Society legislation that came up was one that is of national importance. It appears that the dental law of the State of New York gives this Society the power to designate the colleges whose diplomas shall entitle the possessor thereof to practice dentistry in the State. In accordance with this law the Society, at this meeting, adopted a list of medical and dental colleges whose diplomas will "pass muster," and which are to be placed in the hands of each county clerk for their government. Consequently, hereafter, any one who does not possess a diploma issued by one of the colleges named on this list will be debarred the right of registration and practice in the State, unless, perchance, he passes the regularly constituted Board of Censors, who are also appointed by the Society. It thus appears that this Society possesses a pretty strong "twist" upon the colleges, and that they propose to use it hereafter. There were some significant *omissions* on this list as adopted, a fact which those interested will probably take early notice of. Nor is this all. By practically a unanimous vote, a resolutlon was adopted, "requesting" the faculty of one of the oldest dental colleges in the country to appear before the Society at its next meeting "to show cause why the name of said college should not be stricken from the list," and that parties holding diplomas from said college be debarred from "registering" until such time as the faculty shall thus appear and satisfactorily explain, or meet, the charges made. The charges, we understand, are irregularity in issuing diplomas. We do not understand that the Society wish to cast any dishonor upon any college whose name does not appear on this list as adopted but, rather, that they are not at present sufficiently informed as to the standing of colleges so omitted. It would seem, however, that this Society possesses the power, conferred by the law of the State, to brand any college with the stamp of dishonor and publish the fact to the world.

It is of no little significance to the dental profession that there is a power already in existence that is thus enabled to "go behind the returns" of our colleges. If more of our State Societies possessed the same power it might prove advantageous to the future of dentistry in this country.

The following gentlemen were made the recipients of the degree of M. D. S.: J. J. Mills, Poughkeepsie; Lonado Frazee, Brooklyn; A. M. Wright, Troy; H. Allen, Gloversville; DeWitt Barker, Brooklyn, and L. M. Hall, of Rome.

The report of the Committee on Dental Law recommending that steps be taken to erase from the dental register in each county names of persons who have registered illegally, and on diplomas obtained from the "diploma mill" at Delavan, Wisconsin, was adopted.

President Straw, in his annual address, referred to the cause and prevention of the wide-spread decay of teeth, and felt impressed with the idea that the profession could not better fulfill its destiny than by devoting itself, heart and soul, to the great educational work of how best to fight the fell destroyer.

The physician and dentist should make themselves felt to be the dispensers of that knowledge which will guide the erring into paths of rectitude and happiness—should inaugurate a day of scientific investigation which would create a stampede toward the goal, where prevention more than remedy holds sway. The rising generations should be educated in the theology of all that concerns brain, muscle and nerve, and rampant luxury and debasing habits of all kinds would give place to high-toned morals, and smooth, physical running gear would be the sure result.

Dr. W. D. Miller, of Berlin, was unanimously elected an honorary member of the Society.

MICRO-ORGANISMS.

At a recent meeting of the Royal Medical and Chirurgical Society of London, Dr. Henneage Gibbes exhibited a number of the different forms of putrefactive bacteria: A section of diphtheritic membrane, showing two forms of micrococci, one large in groups, the other much smaller in masses. A section of human spleen from a case of tuberculosis, showing large micrococci in groups; similar organisms were found in the liver and lungs of this case. Sections from the livers of two pigs, which had died of the purples or "red soldier." These were sent to Dr. Gibbes by Mr. Crooke, of the Leeds Fever Hospital. Sections of these livers were full of bacteria, but the forms were quite different in each. In one liver the bacteria consisted of short rods not joined together, in the other they were very long and slender. Sections of kidney from one of these cases showed the vessels full of a form quite different to those in the liver. Stool from a case of infantile diarrhœa, showing organisms very similar to those in the specimens of rice-water stools sent by Prof. Strauss. Very large organisms from the stomach in a case of carcinoma of pylorus spirilla vibriones, various forms of bacteria in chains, micrococci from putrefying animal matter in water. Section of mesenteric gland, showing the so-called typhoid bacillus. Human sputum from cases of tuberculosis; one specimen showed different forms of bacteria in the field of the microscope, and this with an oil immersion lens magnifying 600 diameters. These specimens were shown with Messrs. R. & J. Beck's new pathological microscope, which they have made from Dr. Gibbe's designs.

TIME OF MEETING CHANGED.

The semi-annual meeting of the Connecticut Valley Dental Society will be held at Savin Rock, New Haven, June 19 and 20, instead of on the 18th and 19th, as at first announced—the change being made on account of the ceremonies connected with the unveiling of the Buckingham monument, at Hartford, June 18. A large attendance and a good meeting are assured.

THE INTERNATIONAL MEDICAL CONGRESS

Will meet at Copenhagen this year, during the month of September. It will not have a section devoted especially to Dentistry, but in a letter from the Secretary we learn that measures will be taken to provide for this specialty in the section for Surgery, provided the number of dentists present should prove sufficient to warrant it.

ROBINSON'S FIBROUS AND TEXTILE METALLIC FILLING.

We have before spoken in commendation of this material, but after a personal experience of more than a year we wish to further emphasize our appreciation of it, as a filling material especially. That it is a good thing when used as a lining for vulcanite work we have no doubt, but cannot speak from a personal experience. As a filling material we are using it with great satisfaction and to a much larger extent than formerly. We have yet to see a single case where we have had the slightest reason for regretting its use; on the contrary, results have invariably shown the wisdom of using it. We, however, have only used it as a base upon which to build gold. We have never had a case where gold has failed to adhere to it, or cleaved from it afterwards. It is used rapidly and easily, and is a great help in starting a filling of gold at difficult points of access. At the cervical margins we believe it to be much safer than gold, and where cavities are deep we almost invariably use it as a means of preventing thermal influences. It is a great saving of time and labor to the operator, and we fully believe that, in very many cases at least, its use adds very materially to the lasting qualities of the operation, to say nothing of the future comfort of the patient. We would almost as soon think, to-day, of abandoning gold itself as to try to get along in our practice without this material. If any dentist does not use it, it must be that he does not understand its excellent qualities.

We say this because of our interest in the good of the profession. We have not the least interest in its sale or manufacture, and have not even been *asked* to say anything of the kind by those who are so interested.

A NEW CHEMICAL PRODUCT.

Mr. Kordig presented lately to the Society of Encouragement an inflammable liquid, producing a white flame, which does not burn the body, not even heating the point from which it burns.

A finger dipped in this liquid and lighted would serve to light a candle near by, without feeling the heat; spread upon the floor, the handkerchief, hay or straw, the liquid alone burns without setting fire to the objects which it touches. This liquid boils at 31° C., and it is thought to be very carbonaceous and volatile. Its evaporation lowers the temperature of the parts it touches and protects them against the changes which the combustion would otherwise produce.

Whatever may be the interpretation, it is a liquid endowed with very valuable qualities. We know that gun-cotton burns upon the hand without the heat becoming unbearable, and that it can be burnt upon a heap of powder without the latter taking fire, but this new product far surpasses the gun-cotton.—*Moniteur Scientifique.*

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Dr. J. E. Garretson wrote to us one of his pleasant letters about our criticism of the term "vice of syphilis," which he used in his book. We agree with him perfectly in what he says, that he used the term in the sense of a defect, only the term "vice" has at present assumed overwhelmingly such a peculiar church meaning that, whatever may be the meaning put by the old Latins to the word "vitium," or by some classic writer to its English derivative, "vice," the term will be and has to be understood by its more common meaning. The use of such a term which has assumed a very different meaning in a sense which, while correct, is not at all the common one, was exactly what prompted us to the criticism; it is not that we do not acknowledge that this use may be justified, but we like the extermination of all vague, obsolete and otherwise objectionable meanings of words for which we have more exact and unmistakable scientific terms. The terms "syphilitic ailment," "syphilitic cachexia," "syphilitic derangement," "syphilitic diseases," are all more precise than the term "vice of syphilis," which smells moldy, and parson-like. It may be an almost worthless splitting of hairs, but these little hairs constitute the language, and our ideas are apt to become muddled if famous teachers use words in an ambiguous sense.

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Rich people and rich bequests are not restricted to America. The Countess of Bose has bequeathed $200,000 to a scientific society at Frankfort, $180,000 to the University of Jena, $180,000 to the University of Bonn, while a banker of Cologne has built a foundlings' asylum in that city costing $280,000; this in one week. It may be seen that while the Americans mostly give money for missionary and priesthood purposes, the German gives his for scientific purposes.

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Every tissue, by the inflammatory process, is reduced to the condition in which it existed in the first stage of its development—that is to say, to a condition corresponding to its embryonal state.—HEITZMANN.

UNDERWOOD'S PAPER.

We are pleased to place before our readers Underwood's paper "*On the Influences of Micro-Organisms in the Production of Caries,*" which may be found in this number of the JOURNAL. To Underwood and Milles belong the credit of first calling the attention of the dental world to the fact of the actual presence of micro-organisms *in* carious dentine; their paper of August, 1881, read before the International Congress clearly demonstrated this fact. Since that time many others have verified their observations, and have assisted in bringing the matter before the profession in such a way as to command universal attention, and to excite the inquiry as to the details of their action. As a result, the conclusion is forced home upon every mind, who has kept abreast with the investigations, that micro-organisms of the various classes are the essential factor in dental caries; that without them caries is impossible. If, heretofore, any one has doubted that the evidence was sufficient to warrant such a conclusion he will only need to carefully and understandingly read this last paper in connection with the series published by Dr. Miller, in order to arrive at the conclusion that there is no escaping such a claim. It being thus clearly proven that the production of destructive acids is *dependent* on the action of micro-organisms; that the "inflammatory action," if any, is the *result* of their action, there can therefore be no longer any question as to the propriety of placing these organisms at the "head of the procession." It will be remembered that Mr. Underwood asserted, during the discussion that followed the reading of his paper before the International Congress of 1881, that "Germs are never secondary, but always primary" causes of caries. A further investigation, not only by himself but by others, shows that this assertion is based upon indisputable facts, and needs no modification. The "head devils" in the warfare against the teeth are unquestionably micro-organisms. It is the inward persuasion of this fact, even if not openly admitted, that gives a semblance of pertinence to the question of antiseptics, which so largely engrosses the attention of the profession at the present time. A careful reading of the paper is suggested.

TRANSLATIONS.

SUBSTITUTES FOR LOST JAWS.

BY DR. W. KAY, OF BERLIN.

[Translated from the Zahntechinsche Reform, February, 1884.]

Continued from page 158 of the Journal for April, 1884.

The next step is the modelling of the piece. The substitute we now make is often but a trial piece, as we have in many respects to work a great deal according to our judgment; there is no certainty that the finished piece, as modelled, will harmonize with the proportions of the face; whether the size of the mass which is to obviate the defect is suitable. As the substitute for the case now under consideration is to be held by two teeth, it is evident that with the considerable strain to be put upon them, the substitute must be made as light as possible, in order not to loosen the supporting teeth by too great pressure. We cannot, therefore, fill the defect with a massive substance, neither can we form the plate according to the shape of the defect, as then the arch of the mouth necessary for a correct speech could not be obtained. The substitute must therefore consist of a hollow mass which gives on the lingual side the regular shape of the roof of the mouth. We now, for this purpose, after removing the articulating plate, apply again a strong gutta-percha plate to the upper model and press it tightly everywhere, especially in the cavity of the defect. Then we take the clasps out of the articulating plate and press them into their place in the gutta-percha. Then we take loose cotton-wool or prepared wadding about the size and form of the cavity, put it into it, and cover it with a wax plate so that the shape of the roof of the mouth is obtained. Now the teeth are fitted according to the articulation, and the substitute is tried in the mouth. If everything fits and the articulation is satisfactory, we next make the mass according to judgment, higher and thinner toward the outside. This has the purpose of evening the impression, which has, in consequence of the contracted buccal muscles on these places, proved too small, as may with certainty be expected. The substitute is coated with oil and carmine, put upon the model, and the plaster is removed at the marked places, till the plate fits accurately on the model. A buccal protector is now formed on the side of the substitute, a little above the teeth, which, starting from the incisors, is increased in breadth as it goes farther back, but hollowed out on the side facing the teeth.

This is done in order to aid the expansion of the buccal muscles and to make the cheeks fuller, and to prevent the mucous membrane from being caught between the teeth in mastication. This addition should reach to the pharynx on the defective side and be made sufficiently long to close the aperture leading to the nose, if desired. Having gone thus far the model is secured, with the plate on it, in the lower part of the flask. After the plaster is well hardened, everything is well oiled except the teeth; then the upper part of the flask is placed in position and filled. After the plaster is hardened the flask is well warmed, so that the gutta-percha may become soft, and the teeth, when opening the flask, easily come out and remain in the plaster of the upper part of the flask. Now the wax is scalded out and the gutta-percha and wadding are removed. The surface is now everywhere covered with talc, and a plate of common red rubber placed upon the model and also very carefully pressed into the cavity of the defect; then the cotton-wool, covered with rubber, is also placed in the cavity, and more rubber added, as it may be required. The canal leading to the nose is then filled with palate rubber. Then the clasps of the teeth in the upper part of the flask are covered with small pieces of rubber and the cavity of the buccal protector also filled. After this, the two parts of the flask are carefully put together, heated and pressed to each other, small drainage canals having of course been previously made all around the flask. When opening the flask the rubber adheres to the upper part in consequence of the model having been covered with talc, and we can thus ascertain whether sufficient rubber has been used. As the plate and its additions do not have anywhere excessive thickness, it is not necessary to vulcanize at a very low temperature. After vulcanizing, finish up and prepare for the mouth. As I have already mentioned, this substitute serves very often only as a trial plate, in order to expand the muscles and ascertain whether it can be worn with ease. Should there be too much pressure in some places, then filing is necessary until it disappears. If but little filing is needed, we can polish these places, and the substitute can then be worn. But if much has to be removed, so as to make an aperture in the substitute, it must not be patched, but a duplicate should be made. For this purpose a fine layer of wax is melted on the defective places, so that the case shows everywhere a smooth surface. Then plaster is poured on the palate side, about the height of a model, and plaster allowed to fill in the space surrounded by the clasps, but elsewhere to go only as far as the edge of the case, so that it may be easily taken off. The model so obtained is trimmed, and one channel lengthwise, and some across, about half-way, made. Then the whole case is oiled, including the exterior, and plaster is poured, quite thick, on the whole model, beyond the teeth, so that they are covered up to the rubber, on the inner side. When the plaster has well hardened, we saw apart this outside layer of plaster in the middle, or oiled paper or tin foil may have been inserted into the soft plaster. We can now separate both sides with care and put them into water so that they may be well soaked. Then the palate plate is sawed out almost up to the teeth all around, and the teeth and clasps are removed from the remaining rim of rubber. Now we put the palate plate again on the plaster now serving as model, put the teeth in their places, and also the clasps in their right place. Both sides are now attached and tied together, or held with the hand, and some wax melted in a spoon and poured between the teeth; if we turn the model as required, the wax will run everywhere. It fastens the teeth and takes precisely the form of the removed rubber. The two side overcoatings, to which the wax, on account of their humidity, does not adhere, can now cautiously be removed, and after taking away unnecessary wax, and modelling tastefully the case elsewhere, we fasten it on the model and proceed with the rest as already shown.

It is better to vulcanize on the model than to simply plaster the wax piece as, when removing, it might, on account of the clasps and the irregular form of the cavity, very easily be distorted.

[To be continued.]

SELECTIONS.

ON THE RELATIONS BETWEEN DENTAL LESIONS AND DISEASES OF THE EYE.

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[Read at a meeting of the Odontological Society of Great Britain, November 5th, 1883, and reprinted from the Transactions of the Society.]

[Concluded from page 188.]

I now proceed to the consideration of the last class of cases into which I divided the ocular troubles caused by dental lesions, namely, those in which the reflex action is exerted upon the optic nerve and retina and intra-ocular structures.

And first in regard to the occurrence of *amaurosis;* the most brilliant case on record is one that is now of somewhat ancient date, having been given by Sir William Lawrence, but which is so convincing that I venture to reproduce it here.

"CASE 7. *Amaurosis caused by a carious tooth.*—F. P., thirty years of age, possessing a good constitution, and enjoying good health, with the exception of pains in the head and limbs, which never lasted long, suddenly experienced, in the autumn of 1825, a violent pain, shooting from the left temple to the eye and the side of the face; he ascribed it to cold. This pain lasted several days, then lessened, and reappeared from time to time without being sufficiently severe to induce the patient to seek medical aid. In about two months it suddenly increased in intensity, occupying the eye particularly, with a feeling as if it would pass out of the orbit. F. P. now discovered that he was blind with that eye, and applied to a neighboring physician, whose treatment, continued for two months, did no good. The pain, however, was no longer continual; it assumed a somewhat periodical character, leaving the patient easy for some hours of the day. At the end of the following six months the pain increased, the cheek swelled, some spoonfuls of bloody matter were discharged by a spontaneous opening in the lower eyelid, after which the swelling subsided, and the pains nearly disappeared, although the blindness remained complete. The discharge was removed from time to time during the following six months, and there was no great suffering. But in the autumn and winter (1826) the pain, particularly in the eye, became so violent that F. P. came to Wilna in the beginning of 1827, determined to have the organ extirpated if no other remedy could be found. Professor Galezowski found the left eye totally insensible to light, with the pupil dilated and no other visible alteration. The pain, not then so severe, consisted in violent occasional pricking or darting sensations in the left temple, and parts round the eye. There was discharge from the lower eyelid. The first molar tooth of the left side was carious; it had not caused much uneasiness; and the toothache, when it existed, had not coincided with the pains in the temple and eye. The Professor determined on removing this tooth, and having done so, was surprised to see a small foreign body at the extremity of the fang. When drawn out it proved to be a small splinter of wood, about three lines in length, which had traversed the center of the tooth, and had probably been introduced in picking the teeth. A probe was passed from the socket into the antrum, from which a few drops of thin purulent fluid escaped. The pain ceased almost entirely, and on the same evening the eye began to be sensible to light. Vision gradually improved, so that, on the ninth day, the patient could see as well with the left eye as with the right, after a blindness of thirteen months; on the eleventh day he left Wilna to return to his family."

"I had," says Sir William, "the pleasure of becoming acquainted with Professor Galezowski when he visited England subsequent to this occurrence. He showed me the tooth and the splinter of wood, and he pointed out two circumstances in the case as particularly worthy of notice: First, that the entrance of the foreign body into the tooth had not been noticed at the time; and secondly, that a local irritation, hardly perceived at the seat of injury, should have affected the ramifications of the nervus trigeminus so violently as to produce amaurosis."

I have met with no other case that is so complete as this; but Caffe refers to a case in which blindness proceeded from a carious tooth in the upper jaw, and occurred whenever food collected in the cavity; and I have myself recently met with a case in which loss of vision occurred for a few minutes each time that, in clearing the cavity of a carious molar for plugging, the instrument caused pain.

Sir Thomas Watson refers to the repeated occurrence of blindness cured by the extraction of irregularly arranged teeth. Sudden blindness occurred in a boy eleven years of age. This was immediately cured by the removal of two permanent and four milk molars from a very closely compressed set of teeth; and Garretson reports a case given by Salter. A woman, twenty-four years of age, suffered from violent pain in the right upper first molar, which was accompanied with great swelling of the face; the globe was protruded and vision was lost. A fistulous opening, from which pus flowed abundantly, existed at the outer as well as at the inner angle of the antrum. The cause of the suppuration in the antrum was the remains of the first upper molar; when this was removed a sound was passed into the antrum and a sequestrum was brought away. This proved to be the antral part of the floor of the orbit, the upper part of the malar bone, with the foramen infra-orbitale, and a broad, bony plate of the nasal wall of the antrum. The inflammatory symptoms immediately subsided, but there was no perception of light, and the pupil remained immovable. Five weeks subsequently the pupil began to respond to light, but there was no return of vision. Ophthalmoscopic examination of the eyes showed white atrophy of the optic disks. Gill concludes his essay with the statement that the phenomena which depend upon the optic nerve are attributable to a plastic inflammation, which affects the extra-cranial portion of the nerve. If the optic nerve is destroyed by this means, the blindness is persistent. The oculomotor nerve suffers temporarily only; therefore also there is only temporary rigidity of the pupil. The protrusion of the bulb indicates that the sixth nerve is little or not at all affected. Mr. Gill is doubtful whether to regard the anæmia of the optic nerve as a cause or a consequence of the abolished function.

A case of sympathetic disease of the eyes in consequence of irritation of the dental nerves is given in the "Revue de Thérap. Med.-Chir.," August, 1871. The ocular and palpebral conjunctiva of the eyes and eyelids were much congested; the vessels filled to the corneal border. Severe pain was experienced at night; there was considerable photophobia; the head was heavy and painful, tongue coated, appetite bad, pulse small and frequent. The affection lasted five months. Ten leeches were applied to the angle of the jaw, a collyrium of sulphate of zinc and a purgative prescribed, which led to some improvement. After the application of a blister to the back of the neck, the pain recommenced. As the left molar was very carious it was removed, with the effect of immediately removing the symptoms, and in the course of a week the patient could use the eye again.

Gill, about the year 1873, read a paper before the Missouri State Medical Association, on "Disturbances of vision resulting from neuralgia of the fifth pair of nerves consequent on dental affections," which I have not been able to procure, but which is translated in the "Deutsches Vierteljahrschrift für Zahnsheitkunde," B. IV, p. 11, and is fully abstracted in the section on "Mund und Zahnkrankheiten," by Dr. Albrecht, in the "Jahresbericht für Gesammten Medicin" (V. Virchow, V. Hirsch) for 1873, B. II, p. 537. The following case is given in this paper. The patient was thirty-three years of age, and in the early part of the winter of 1870–71 began to experience neuralgic pains in the head and face, which lasted to the middle of summer. The neuralgia extended over both sides of the head, and so far affected the visual power that the patient was no longer capable of reading. In the middle of the summer the neuralgia disappeared, and the vision became normal. In July, 1871, the neuralgia recurred, and coincidently there was diminution of visual power; the patient could only read Jäger No. 16. The pain experienced was especially severe at night. Examination with the ophthalmoscope showed that there was sub-retinal effusion, and that the retinal arteries were ill-defined. There was a well-marked painful spot.

Examination of the apparently sound teeth showed that there was necrosis of the exposed left superior maxilla, but more careful examination demonstrated that the supposed necrosis was only a collection of tartar, which had surrounded the roots of the first and second molars. These two teeth were extracted, and a wide zone of ulceration was found around their roots, and to a smaller extent about the root of the second bicuspid, which after the lapse of a few days was also removed. The neuralgic symptoms immediately abated; the amblyopia, or dimness of vision, was reduced, and in the course of a week the patient could read again No. 6.

Mr. Hutchinson, in one of the early volumes of the Ophthalmic Hospital Reports, has pointed out that certain cases of amaurosis bear a very close resemblance to infantile paralysis. "Without any warning whatever, without any cerebral symptoms, a patient loses the sight of one eye, and now and then, but very rarely, of both eyes." In some cases, he goes on to remark, there is a certain amount of improvement afterwards, but often the amaurosis becomes total and permanent. In some instances the optic disk becomes white and atrophic, but in others it retains an almost normal vascular supply. Most of the cases which had come under his notice were women. In some, evidence of cardiac disease existed; in others there was none; and in most he found the *arteria centralis* of good size, so that the hypothesis of embolism seemed to him to have but little support. In several of the best marked cases that he had seen there was a history of neuralgia in the face for a long time before the occurrence of the amaurosis, the neuralgia being usually connected with toothache.

Alexander of Aachen has reported the following case of amaurosis resulting from dental disease.

A patient, æt. twenty-six, had slight myopic astigmatism, which was, however, insufficient in amount to explain the greatly lowered visual power of the right eye. The right optic disk was somewhat hyperæmic. Abstraction of blood was ineffective, and in a subsequent examination the failure of vision was so great that the patient could only read Jäger No. 15. The patient then complained of severe pain in the upper right anterior molar tooth, and observed that it had been for some time periodically affected. The tooth was extracted, and vision almost immediately rose to two-thirds of its normal amount in the right eye, and became quite normal in the left eye.

In this, as well as in other reported cases, the eyes have often been slightly defective originally, and it stands to reason that any sympathetic influence is more likely to be felt by those in whom the functions of the eye are from any other cause impaired; or perhaps it might be said that sympathetic affections are more likely to be superimposed upon defective than upon sound eyes. Thus a patient who has perfectly healthy eyes may long resist the depressing influence of toothache, but if his eyes are already congested or exhausted from uncorrected hypermetropia, it is easily intelligible that pain, by depressing the nervous energies, will cause the weakness of the ciliary muscle to be felt at an earlier period.

A similar case, in which an amaurotic condition of the eyes was improved by the removal of the stopping from a carious tooth, and was subsequently entirely cured by the removal of the tooth, has been reported by Dr. M. F. de Witt. A strong and healthy man, æt. thirty-one, discovered that his right eye was blind. No pain, no photopsiæ had been experienced. He could distinguish light from darkness with the affected eye, but that was all. He was unable to give any account of the cause of the attack, but after awhile he remembered that two months before losing his vision several teeth had been stopped. He had often felt pain near the first molar tooth of the right side, and he had often also experienced pain and tenderness of the gums, and abscesses had formed which he had himself opened with a penknife. On examination the tooth was found to be reduced to a shell, with a fistulous opening leading to the alveolus. Dr. de Witt, suspecting irritation of the fifth nerve proceeding from the teeth, removed the stopping in order to obtain a counter-opening, and to permit the fistulous orifice to close and to arrest the irritation. The immediate effect was that the gum ceased to be sore, and the visual power began to improve. After three weeks, when the sharpness of vision had greatly improved, the gums again began to be sore, and coincidently the acuteness of vision diminished. The affected tooth was extracted, and improvement then again took place, and vision became restored almost to its normal amount, though still not equal to that of the other. The fang of the tooth was filled with pus.

M. Nicaise remarks that he knew that in certain cases the irritation of a dental nerve may induce troubles, which indeed are often only transitory, of vision. These disturbances are explicable on the ground of the intimate relations which exist between the different branches of the fifth pair of nerves, the function of which is sensory, and which govern also the nutrition of the regions to which they are distributed. If the irritation of the fifth nerve is persistent, and if it ends by effecting some alteration in the nerves, it is possible that the disturbances of vision may become more serious and even permanent. Glaucoma, which is especially due to troubles of nutrition, may possibly have its point of departure in a lesion affecting the superior or inferior dental nerves. . . . . . .

The writing of this paper has recalled to my memory various cases which were in the highest degree suggestive of the teeth being the starting-point of the trouble, and to which I regret extremely I did not direct a larger amount of care and attention at a period when it might have proved of service. To give one only:

Mrs. S., æt. thirty-two, a stout, ruddy-complexioned woman, suffered in 1878 and 1879 from colored haloes round lights, and the general symptoms of glaucoma. For these there was no apparent cause. She was healthy, in easy circumstances, and her habit of body and general manner of life were thoroughly normal and good. She, however, suffered severely from toothache. A particular tooth would begin to ache, without apparent decay of the crown. After enduring the pain for some time she would have the tooth extracted, and an abscess was always found to exist at the root. In March, 1880, after a fall which intensified all the symptoms, an iridectomy was performed on the left eye. The wound did not heal kindly, and a cystoid cicatrix was the result. The vision gradually deteriorated, and ultimately was entirely lost.

She now had two miscarriages, and some circumstances occurred in the family causing her much mental distress and depression of spirits, with frequent shedding of tears. I saw her first about eighteen months after the operation had been done.

The right eye was now the seat of trouble, but the vision was still very good, and with appropriate glasses (+ 1 D) could be rendered perfect. Three weeks previously she had awaked with violent pain, which lasted for three days; she saw bright lights, and the eye was hard, and the optic disk was white and cupped. She was told she had glaucoma, and that if the vision deteriorated she must submit to an operation. It did deteriorate rapidly, and I performed an iridectomy in the hope of saving vision, but the wound passed through the same stages as with the previous operation, and a cystoid cicatrix was formed with persistent high tension of the globe of the eye. I saw her only a few days ago with complete blindness of the left eye, and only perception of very bright light in the right eye. She again repeated to me the story of the teeth, and I could not but think that if a similar case appeared before me now, instead of trying iridectomy —which was here a signal failure, even when performed by two different operators, and which resisted eserine, and all the usual methods of reducing tension—I should at once have every tooth carefully and thoroughly inspected by an experienced dental surgeon. And I would ask whether such a case is not adapted for the removal and replantation of teeth, if these, after extraction, were found to be sound.

I fear, Mr. President and Gentlemen, that I have wearied you with cases, but I trust I may stand excused when I say that most of these cases are germane to the matter, and that my object has been in part to draw the attention of some amongst you who may not have given it a thought, to the close relationship which exists between the teeth and the eye, different as these organs are in their mode of development, their histological characters, and physiological uses, and in part to elicit from you some information that may prove of service to the ophthalmic surgeon, and may afford him some hints of the kinds of disease of the teeth which he is likely to overlook, and which it is important that he should recognize.

In conclusion, then, I think it may be laid down as a maxim to be generally observed that in all cases of threatening glaucoma, especially when this is associated with ciliary neurosis and obscure pains in the temples and maxillary orbital regions—in all cases of mydriasis, and probably of myosis, originating without apparent causes—in all cases of sudden paralysis of either of the orbital muscles, or of loss of sensation in the absence of cerebral symptoms—in all cases of phlyctenular disease of the conjunctiva—in all cases of ulcers of the cornea resisting ordinary treatment—in all cases of sudden failure of accommodation, especially in young children—and finally, in cases of exophthalmia, the condition of the teeth should at least be examined, and if faulty conditions present themselves these should be at once rectified, and then one at least of the possible causes of each of these diseases will be removed.

BOOKS AND PAMPHLETS.

NOTES ON DENTAL PRACTICE, by Henry C. Quimby, Licentiate in Dental Surgery of the Royal College of Surgeons in Ireland and Member of the Odontological Societies of New York and London. Published by the S. S. White Dental Manufacturing Co., Philadelphia.

This is a work of about two hundred pages, well printed and illustrated, and is confined, principally, to "the treatment of abnormal conditions of the teeth." It is the result of the teachings of the personal experience of one who has seen much practice, and who thus makes known to the profession the lessons gained. All such works possess much value and add to the available knowledge of the profession. Such publications are to our professional literature what the relation of "incidents of office practice" is to our dental meetings. The aggregation of personal experience and the statements of individual methods constitutes much of our most practical literature, and as such we can cordially recommend Quimby's Notes to the profession.

LISTERINE—Opinions from the dental and medical professions is the subject of an elegantly bound little volume—cloth—laid upon our table by Lambert & Co., Manufacturing Chemists, 307 Locust street, St. Louis, Mo. It presents extracts from the opinions of many well-known dental and medical gentlemen whose experience with Listerine has been favorable. Also the formula, dose, etc. Listerine seems to have become an essential in the practice of many of our best operators, and we hear it widely spoken of in the various society meetings with much favor.

By sending your name and address, the publishers will forward a copy to any who may wish.

IODOFORM IN DENTAL SURGERY, by C. F. W. Bödecker, D. D. S., M. D. S., New York. Reprinted from the *Independent Practitioner* of March and April.

An excellent paper by one of our best writers.

SOCIETIES.

The Massachusetts Dental Society will hold its semi-annual meeting, for 1884, at Boston, June 5 and 6.

The eighth annual meeting of the New Hampshire Dental Society will be held in Concord, June 17. Board of Censors will meet Monday evening, June 16, at 7 o'clock, at Phenix Hotel. Arrangements are being made to make this the largest and best meeting the society has had. All dentists of the State are cordially requested to be present.

E. B. Davis, *Sec.*

CONNECTICUT VALLEY DENTAL SOCIETY.

Change of Date.

As the dedication of the Buckingham monument takes place at Hartford, June 18, the meeting of the Conn. Valley Dental Society has been changed from June 18 and 19 to June 19 and 20, at Savin Rock, New Haven, Conn.

W. F. Andrews, *Sec.*

MONTHLY LIST OF PATENTS.

For Inventions relating to Dentistry, bearing date April 22, and May 20, 1884. Reported expressly for this Journal by Louis Bagger & Co., Mechanical Experts and Solicitors of Patents, Washington, D. C.

295,821—Dental vulcanizer. F. W. Seabury, Providence, R. I.
296,078—Dental drill hand-piece. J. H. Siddall, Canton, Ohio.
296,690—Dental mold. J. W. Hayford, Tiffin, Ohio.
296,992—Dental rubber-dam holder. R. H. Hoffit, Harrisburg, Penn.
298,717—Dental foil condenser. R. S. Williams, New York, N.Y.
298,716—Wrinkling gold dental foil. R. S. Williams, New York.
298,483—Dental hand-piece. H. Laurence, Chicago, Ill.
299,040—Dental engine angle attachment. A. Weber, New York.

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ORIGINAL COMMUNICATIONS.

THE SEPTIC THEORY OF DENTAL CARIES.

BY F. SEARLE, D. D. S. SPRINGFIELD, MASS.

[Read before the Conn. Valley Dental Society, June, 1884.]

In 1877 Arthur S. Underwood, M. R. C. S., L. D. S., Eng., and W. J. Milles, L. R. C. P., London, F. R. C. and C., undertook "to determine, as far as possible, to what extent germs are present in the dental tissue when in a state of disease, and to deduce conclusions as to the effect of their presence." After four years' patient investigation, they published their first report of their progress in a paper read before the International Medical Congress, in which they say:

"We consider that caries is absolutely dependent upon the presence and prolification of organisms. This view we propose to call the 'septic theory.'"

In the examination of this theory, it will be necessary to go over a somewhat extended field of inquiry, and introduce some other theories for examination. Investigators into the phenomena of diseases are liable to seek an explanation in the insufficient evidences of their own discoveries, without taking into account what others have done or are doing in the study of questions bearing directly upon the subject which they are examining. Especially has this been the case with recent investigators of dental caries.

When Underwood and Milles in England were making their investigations in relation to organisms, they seemingly did not take into account the discoveries of Dr. Bödecker, of New York, in relation to the distribution of living matter in bone, dentine, enamel and cementum, or of the observations of Dr. Abbott respecting the evidence of inflammation in diseased fibrils. Dr. Abbott was equally uninformed of what Underwood and Milles were proving in regard to the presence and agency of germs in the fibrils. He saw the evidences of inflammation, but not, as I think, the *true irritant.* Underwood and Milles saw the irritant, but not the *inflammatory appearances* of the fibrils, or at least did not take them into account; consequently, they announced their septic theory, and Dr. Abbott his inflammation theory. The reviewer can gather and arrange all the evidence from all sources and thus form an unbroken chain of evidence, composed of demonstrated facts and legitimate deductions from those facts, which will explain more than any theory supported only by incomplete and one-sided observations.

I propose to gather up the important facts which have been reasonably well established, bearing upon the question of caries, separating them from mere opinions, and endeavor to find what they teach.

Our subject is intimately related to questions which have occupied the attention of chemists for more than two hundred years. It is, in fact, one of the latest questions of a large and rapidly increasing number, growing out of those minute yeast granules which Leeuwenhoeck discovered in 1680, and which Cagniard-Latour, and Schwann *re*-discovered in 1836–39, and which were the starting point of that long discussion between Pasteur and Liebig and their respective schools of the true theory of fermentation, which lasted from 1840 to 1870, and which the illustrious Pasteur has completely answered by a series of experiments which, in the language of Miles, are "classed among the most brilliant records in the history of science." "The true ferments are now known to be living organisms that produce fermentation as a function of vital activity." Unlike the soluble ferments, these living organisms increase at the expense of the substance fermented. The true fermentations are purely physiological processes, which are defined by Pasteur as the "direct consequence of the processes of nutrition, assimilation and life when they are carried on without the aid of free oxygen, or as a result of life without air." (P. S. M., p. 225.)

The discoveries of Schwann, Pasteur and others, in regard to the agency of the germs of micro-organisms, laid the foundation upon which Lister, 1865–67, established the germ theory of contagious diseases, and the septic character of some diseases not so contagious. Lister, an eminent French surgeon, had previously exhausted all the resources of the old methods of dealing with septic diseases by efforts to exclude the oxygen of the air from wounds, etc., with unsatisfactory results. The revelations of Pasteur opened his eyes to the fact that his foundation principles were defective, and consequently his methods could not be successful. In 1867 he published the results of his antiseptic (and aseptic) methods which he had been testing for two years, with previously unheard-of success. This brought about the great revolution in general surgery which immediately followed, the principles of which have been generally accepted, and now direct the methods of surgery. Without the discoveries of Pasteur and Lister the germ theory of dental diseases would have been long deferred.

In 1873, Liebig and Rottenstein published their work on Dental Caries and its Causes, which contains much of interest upon the existing theories, especially in relation to the germ theory, which they were the first to put into definite form. But the chemical theory held its ground in spite of their discoveries, because there was no Lister to give clinical demonstration of the correctness of their views. We hear but little more upon the subject except in general allusions to the theory in partial approval, or total dissent, until 1881, when Underwood and Milles published their first paper.

The failure of the chemical theory by acids to explain satisfactorily all the conditions present in caries, led these gentlemen "to seek for the presence of organisms in carious dentine with results that far exceeded their expectations."

Their first paper contains the following conclusions:

1. "We consider that caries is absolutely dependent upon the presence and prolification of organisms; that these organisms attack first the organic material and, feeding upon it, create an acid which removes the lime-salts." . . . .

2. "That suppuration of the pulp and its sequences, such as alveolar abscess, depend also upon the successful working of organisms."

In their second paper they say: "We are anxious that you should keep clearly before you four main issues upon which all the theory which we suggested to you in 1881 depends:

1. "That certain forms of micro-organisms, viz: Micrococci, oval bacteria and short bacilli, are invariably present in carious dentine."

2. "That these micro-organisms extend into the tissue as far as does the caries."

3. "That no agent can be made to produce a change resembling caries in the absence of such micro-organisms."

(The fourth I omit.)

They add: "We feel convinced that the process, to be effective, must be carried on in a living mouth, probably because that is the only situation in which the special germs are really active. Analogy seems to warrant this deduction; but," "all we claim for the germs is, that without them and their products the process could not go on at all," "and the dental pathology of the future must include them among the most powerful factors in the production of this disease."

To Underwood and Milles the world is indebted not only for the facts which they were the first to demonstrate, but also for the impulse which their labors gave to other men to make additions to their discoveries.

In the New England Journal of Dentistry, Jan., 1883, Prof. Mayr gives the results of a series of very careful experiments made in the line of analyzing decayed dentine. Of these experiments Underwood and Milles say: "Prof. Mayr has worked out the chemical aspect of the question with great care and exactness." That he is fully competent for a work of this kind, involving great care and labor, no candid man, who is at all acquainted with him personally, with his educational training in the best schools in Germany, his acquaintance with medical and other sciences, and especially his ability in his chosen profession as a chemist, will for a moment question. I give the results of his experiments on the point bearing on the question of dental caries. First, he says: "Let us never confound two things: the structure of a tooth and the chemical nature of a tooth, and that the structure may be broken down and the chemical nature not changed. Result No. 1: No acids or chemical lime-salts are found in the innermost decayed mass. While the chemical composition of the innermost layer is almost (and as was seen in some cases completely) identical with that of healthy teeth, the structure is totally different. The soft, white, friable decay is no longer organized, though chemically only slightly differing from the tooth substance—one showing 72% lime-salts. The action at the innermost layer is not in accordance with what we know about the action of acids."

This paper of Prof. Mayr is full of suggestions and facts bearing directly upon the chemical aspect of the question of caries, and furnishing much evidence in favor of the septic theory.

Dr. W. D. Miller, of Berlin, within the last two years, has published many papers giving at length the processes of his experiments and observations relating to caries, which deserve notice. He then gives the description of the investigations which led him to several conclusions, of which I quote the following:

"The bacilli penetrate far into the dentine, even into the finest branches of the canaliculi. Micrococci penetrate furtherest" (i. e., further than the minutest branches (?)). "The fungi produce anatomical and pathological changes in the deeper layers, stop up the canaliculi and necessarily lead sooner or later to the death of the dentinal fibrils. The outer layers of dentine, thereby deprived of nourishment, die and fall a prey to putrefactive agents."

Dr. Miller thus fully confirms the observations of Underwood and Milles, of Lister and Rottenstein, and every other careful observer, and the presence of organisms in the deeper portion of carious dentine may be considered as fully established.

Dr. Miller differs from Underwood and Milles in this: He claims that there is a zone of softened dentine between that occupied by the organisms and the healthy dentine, which is not infected. His opinion is based on microscopical observations, and this after having said that the bacilli penetrate even into the finest branches of the dentine (softened dentine), and the micrococci penetrate further still.

Underwood and Milles, on the other hand, prove that the germs are present up to the uttermost limit of the affected dentine, by inoculating a pure culture with matter taken from the deepest portions thereof—from the very border line of decay. In other words, they find them attacking the living *organic tissue* of dentine. The question of the effect of their presence here is now the one of paramount importance. The settlement of this very interesting question does not depend upon what organisms or acids may be doing at the more superficial points of the carious mass, nor whether the acids are organic or chemical, but what is going on at the line of battle, where the amæba-like cells of the organisms and bioplasson are contending for dear life, and for food to sustain that life.

Neither Underwood and Milles, nor Dr. Miller, are able to solve this question on the theory that organisms do their work by the acids which they produce. The former say: "The essential element wanting in our artificial experiments is present in the mouth." Dr. Miller says: "I am a believer in acids, a believer in micro-organisms, and a believer in an *unknown cause;* that is, I believe that there are agents active in the production of caries which are yet to be discovered."

Two questions here arise:

1. Is the tooth endowed with living matter capable of taking on inflammatory action?

2. Is there evidence to conclude that the results of inflammatory processes in dentine are analogous to those in bone and other tissues?

In answering the first question, I will refer you to the discoveries of Prof. Heitzmann in relation to the reticular structure of protoplasm, which connect every tissue and organ as it were into one large amæba, and to the researches of Dr. Bödecker concerning "The Distribution of Living Matter in Human Dentine, Cement and Enamel," together with the evidence which your own experience furnishes in your operations upon the teeth. If these, united, do not bring evidence to your minds sufficient to make you give an affirmative answer, ask your patients. Do not think, because these tissues belong to the microscopic world, that they cannot be injured and take on inflammation. All normal and abnormal life action, whether growth or decay, the building up or the taking down of molecules and tissues, belong to the microscopic world. If you discard the vital changes in one set of tissues, why not in all? Yes, there is the intensest vitality in the reticular matter of a tooth. To talk of its low vitality is to contradict the plainest evidence that can be brought to the human intellect.

In answer to the second question, if you admit the self-evident fact of its ability to live and grow and be healthy, you must also admit its liability to disease.

This brings me to the consideration of the inflammation theory of Dr. Abbott.

It has been shown in the laboratory of Prof. Heitzmann that dentine has been dissolved and formation of abnormal tissue has taken its place. This has taken place by true physiological, though abnormal, vital processes. When Dr. Abbott was making his investigations in connection with Dr. Bödecker in regard to living matter in teeth, he observed in the diseased fibrils of the tooth appearances characteristic of the presence of inflammation in other hard tissues, which he thus describes:

"First, irritation (which he thinks is produced by acids), followed by inflammation, swelling of the living matter, which effects the dislodgment of the lime-salts; a melting down of the glue-giving basis-substance, and a bringing to view the embryonal elements of the enamel. These processes follow in greater intensity in the dentine. The lime-salts are not necessarily dissolved and taken away, but may, and I have no doubt, as Prof. Mayr's experiments show, do remain mixed with this disorganized tooth substance." On the hypothesis that acids produce the irritation of the living matter—the reticulum—at the border-line of decay, why should they not also decalcify the lime-salts at this line? Prof. Mayr finds no trace of acids there, and Dr. Abbott accepts the conclusion that they are not there. How, then, can acids set up inflammation? When the germ theory is accepted, the presence of acids at this point will be unnecessary to account for the agents of irritation. With vital organisms feeding upon and multiplying within the pabulum contained in the canaliculi, exhausting and injuring the reticulum, which is directly connected with the reticulum of the pulp and the whole system of tissues, the usual effects of irritation follow until the melting down of the formed material, the liberation of the lime-salts from its meshes and the death of the reticulum put an end to the vital reaction, and the mass is given up to the action of organisms and their products.

The facts already presented are sufficient to establish the septic character of the disease affecting the albuminous or "animal" portions of dentine where caries is present.

In another article I shall present some of the facts already discovered in regard to the action of pathogenic organisms on soft tissues, and also examine the chemical theory which teaches that caries is simply the decalcification of the dentine by acids.

CAST METAL PLATES.

BY L. P. HASKELL, CHICAGO, ILL.

For the lower jaw it is undoubtedly true that a "cast metal plate" of Watt's, Weston's or Reese's metals is the best method for a majority of cases, especially where, as is so often the case, the absorption has been so great as to leave nothing but a thin shallow ridge of membrane, always more sensitive than the upper jaw, and which has, in a measure, to adapt itself to the plate.

By this process there is insured a *better fit* than can be obtained by any other method, for it is cast to a non-shrinking model of plaster and pumice, or sand, or whiting. (I prefer the former.)

It is so often, in this class of cases, that plates have to be filed to relieve irritation; with this work it can be done without marring its appearance.

I like the method of casting the plate to a pattern formed of sheet wax, the edges doubled all around, so that, when finished, it has the appearance of a band, as the rubber is finished flush to that edge. Then file and partially finish, try in the mouth, and cut away where necessary; *spur* the surface with a sharp graver, and attach the teeth with pink rubber.

EDITORIAL.

ANTISEPTICS.

A friend writes us as follows: "As you say, in the May number of the JOURNAL, antiseptics have become the 'burning question' of the day, but I believe there will be found something more in the action of useful antiseptics on tissues than the germicide effect. In this connection, I have in my practice recently obtained results in the treatment of pyorrhea alveolaris which I never accomplished before, i. e., the *complete closure and healing of deep pockets* beside roots of teeth, by the use of tartrate of chinoline (injected into the pockets about three times a week). I have used hydrogen peroxide, H_2O_2, but cannot see very much in it except its cleansing—oxidizing—effect. Corrosive sublimate—bichloride of mercury—I have only used a few times, and cannot as yet form any opinion as to its efficiency, but I have no doubt it will fill a large place somewhere in our work."

In our own practice, these cases of deep pockets of pyorrhea alveolaris yield most readily to a treatment of bichloride of mercury, 1–1,000, injected two or three times a week. Our first treatment is, of course, the removal of all deposits of tartar and necrosed bone, after which the pocket is injected as above. Cases which we should heretofore have expected would require *months* to heal, under the bichloride treatment close up and heal perfectly in as many *weeks*. Cases yield readily to this treatment that have successfully withstood carbolic acid, eucalyptol, peroxide of hydrogen, chloride of zinc, etc.

We also find the bichloride of mercury most excellent for disinfecting putrescent pulp canals. It is more rapid and thorough than anything else we have used. For this purpose we also use a solution of 1–1,000. It is non-coagulative, hence more *penetrating* in its influence. Carbolic acid so effectually *coagulates* albumen that the *agents* of sepsis may not be reached, for much time at least, but a little below the surface, and the putrefactive process may continue much longer in the tubules of the tooth than would be the case if a powerfully penetrating antiseptic was first used. After a single dressing of bichloride has been used it is, of course, well to follow with carbolic acid, or some other coagulating agent.

It seems like a trite saying to repeat, that a successful practice depends upon a diagnosis wherein is apprehended, to the fullest extent, the *exact* conditions of changes going on in the tissues and the causes which lead to those changes, and an *exact* understanding of the action of the remedies used; but it is a saying that, heretofore, never needed to be urged to the extent that it does to-day. A purely empirical practice should no longer be tolerated. For this reason we are to be congratulated that the scientific world is engaged, as never before, in the study of minute pathological changes, and the positive and direct action of remedies, especially along the line of septics and antiseptics.

DR. SEARLE'S PAPER.

We commend to our readers a careful study of the paper of Dr. Searle, on *Septics and Antiseptics*, printed in this number. He has spent a great deal of time in its preparation, and devoted to it the most conscientious and painstaking care and study. His collating, sifting and logical arrangement of the main facts resulting from the more recent investigations of our scientists in regard to dental caries is skillful, ingenuous and convincing.

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Our esteemed cotemporary, *The American Journal of Dental Science*, for *May*, has just arrived—June 16. Has Dr. Gorgas got a calendar for 1884?

THE COMBINATION OF AMALGAM AND OXYPHOSPHATE.

Dr. F. Y. Clark gives the following as his method of combining amalgam and oxyphosphate so as to overcome, to a great extent if not altogether, the objectionable features of expansion and contraction of amalgam, and the discolorations of teeth by this filling material.

"Mix any amalgam in the usual way ready for use, and then with a spatula and glass slab thoroughly incorporate with any good oxyphosphate cement and accompanying liquid until the mass assumes a light grayish appearance and about the consistency of putty; then press into the cavity. When sufficiently hard to bear trimming remove the outer surface below the margin of the cavity walls and replace and finish with some good amalgam that will not discolor and at the end of a few days finish and polish. The amalgam and oxyphosphate should be mixed so as to approach as near as possible to one part of the former to three parts of the latter, just enough of the first to unite with the surface filling which should be introduced in small pieces and burnished against the main filling of oxyphosphate and amalgam so as to unite.

My attention was called to this combination of cement and amalgam several years ago by Dr. Samuel A. White of Savannah, Georgia; but on trial it was found to wash or waste away on the surface; but if used as proposed it acts admirably and removes to considerable extent many objections to the use of amalgam."

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In the Senckenbergische Stifts Bibliothek (Senckenberg's endowment library) in Frankfort-on-the-Main, a whole collection of all the dental journals appearing in the world, is kept. Dr. Adolf Peterman publishes a list of thirty-one dental journals, as representing all appearing on the globe. A number of them are only what we might call, in America, advertising circulars. The average age of all of them, as far as recorded, is 9½ years for each journal. As the oldest, appears the *Dental Register;* and as the youngest, a German journal —fourteen appearing in America (of which certainly one-half is only advertising circulars, and three in England, six in France, three in Germany, one in Belgium, two in *Habana, one in Italy, and one in

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*Why the Americans insist on misspelling the city of La Habana as "Havana," is unexplainable.

Spain. Sixteen are printed in the English language, or almost exactly one-half. Ash and Son, of London, publish three journals; six other "journals" are published by other dental depots, etc.

Other Statistics.—Germany produces yearly more new books than any other country. Recent returns declare the number brought out in 1883 as 14,802, while Great Britain produced 6,145, and the United States only 3,481. Comparative numbers among special classes of literature range as follows: Theology—Germany, 1,504; Great Britain, 704; United States, 375. History—Germany, 795; Great Britain, 414; United States, 119. Medicine and hygiene—Germany, 922; Great Britain, 163; United States, 211. Education and languages—Germany, 2,300; Great Britain, 556; United States, 197. Law and jurisprudence—Germany, 1,301; Great Britain, 139; United States, 397; and in the field of fiction—Germany, 1,207; Great Britain, 349; United States, 670.

Such figures are of little value if we do not think a little about them. Probably a good deal of the difference is due to the fact that it costs much more to print a book in America than it does in Germany, and that books here in America are generally bound and printed much better than German books. The production of books in Germany is to that in the United States as 4¼ :1; in books about theology, the production is about 4 :1; in books about history, 7 :1; medicine, 4½ :1; education and languages, 12 :1; law, 3⅓ :1; fiction, 1¾ :1. This shows that the interest for historical knowledge is in Germany about seven times larger than in the United States, or that seven times more people read history than in the United States, a fact perfectly in accordance with the very defective knowledge of history, displayed even by "educated" people in the United States. The fact that "fiction" in the United States stands three times higher than history, does not speak very well for the "practical" sense of Americans. Fiction is the most unpractical of all things, and the people of the United States give themselves a bad testimony in this predilection for "fiction." Also law seems to occupy far more in proportion than science in the United States, also well explainable by those knowing the complicatedness of the different laws of the many States. Very interesting are also the statistics when compared with Great Britain: In history the two countries, England and the United States, stand as 4 :1; in theology as 1¾ :1; in medicine as 1 :1¾; in education and languages, as 3 :1; in law, as 1 :3; and in fiction as

$1:2$—while in the total the proportion is $1\frac{3}{4}:1$. From this, it is plain that the law is three times more complicated in America than in England. The people in the United States like fiction and dreams twice as much as those of England, but only one-half as much as those of Germany. In medicine, the United States surpass England, while they are far surpassed by Germany. In theology, the proportion is about alike. All these people seem to like theology, and the speculation about the unknown and unknowable in the same rate, but the most conspicuous of all is the great preponderance of fiction to the account of the people in the United States. Fiction is sickly and a waste of time. It is the lazy thing in the line of reading; costs too little mental effort. The United States show too weak in educational affairs in proportion to the monstrous amount for worthless fiction. These figures are hard to dispute away and worth thinking about.

ABOUT THE RUSSIAN LANGUAGE.

St. Petersburg now has a society of dentists. Dr. Waginsky is the president of the "Pervaya Obshch-stva Dantistov w Rossiy." That is the "first society of dentists in Russia." The "oostav" or bylaws have been sent us. We wonder sometimes that Russian teeth are kept sound with that language, but think the considerable movement of the tongue necessary to pronounce Russian words has a tendency to keep the teeth clean. The English nations are very apt to think, because a word does not occur in their language, that it is very hard to pronounce; they are the poorest pronouncers of all, and the members of no other nation are so easily baffled by new words as the English. The Russian language is very much of a spelling language. Its only uncertain sounds are A (ah) and O (oh) which, with a peculiar absurdity, are very often confounded in Russian in their sounds. An O is pronounced oh and ah. The Russian alphabet has forty letters, which is not more than the English ought to have. It has a letter for soft SH and a letter for hard SH; a letter for TCH, but has no letter for H; instead of it the Russians, by another absurdity, always write G and pronounce it with the sound of G in give, so that the word Hancock in Russian would read Gankok. They pronounce such a G often resembling H. Another letter in Russian is for the combined sound SHCH, as in the words fishchowder. There are two forms for I (ee) with only grammatical differences between them. For oo the Russians use the Greek Y. The ü in German, for which the English has no equivalent, has a special letter in Russian; the CH with the German sound has also a special letter in Russian; another special letter is for the sound YE; another, for the sound YA; another, for the sound TS, as in hats. Quite a number of Russian words consist of single consonants like s (meaning "with"), w (meaning "at"). It has also at the end of most words signs to indicate whether the last consonant is to be pronounced hard or soft.

In printing they use a modification of the Greek alphabet and not of the Latin as we do, which makes their printing look so illegible to us.

The language, as such, is extremely rich, and has no need of borrowing from any other. It has not quite the ability of building up words like the German, but supplants this defect by the great richness in suffixes and affixes. It has about nine declensions with seven cases, singular and plural, and full sounding terminations. It has no article. The verb is very defective, having only as simple tenses the present, future and imperfect, the other tenses being lacking, but this lack is supplied by additional infinitive terminations. While Russian is relatively easy to pronounce compared with English, and much less absurd in its pronunciation, it is quite difficult in its word-forms, and the cases of those Englishmen and Americans who learned Russian successfully could probably be counted within the first hundred, while the Russians who know and knew English probably are a thousand times as many.

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At a recent discussion of antiseptics, by the new Military Medical Society of Woolwich, England, Surgeon Major Goodwin, in speaking of the well-worn theory of inflammation and suppuration, contended that they were no necessary result of a wound, and that repair could be obtained without them and with much less risk to life and limb. Sir Joseph Lister, in the course of the debate, spoke especially of the value, as an antiseptic, of solutions of corrosive sublimate, and said they were, in some respects, superior to carbolic acid, in that they were non-volatile, and therefore useful for cleaning sponges, instruments, hands, etc. He also praised iodoform very highly.

ANTISEPTICS.

The researches of Koch have overthrown many old notions in regard to disinfection. They show that it is not an easy task to kill developed bacteria, while the spores defy most so-called antiseptics. The most powerful of all disinfectants he found to be bichloride of mercury, its action being instantaneous in a dilution of one part in five thousand, provided, of course, there are no chemicals present, which unite with and thus render inert the disinfectant. If not thus antagonized, it can permanently check bacterial growth as long as one part in 330,000 is present in this solution.

Next, he places bromine, iodine and chlorine. Carbolic acid, the most common antiseptic agent, is by no means as reliable as is usually supposed. Nothing less than a 3% solution of it can destroy spores, requiring for this purpose at least seven days, while a 5% solution suffices only in from twenty-four to forty-eight hours. The developed forms, however, it kills readily inside of two minutes in the strength of one-half of one per cent. Its power of completely arresting bacterial development is not manifested in any dilution of less than 1 to 850, which will check splenic fever bacilli, while for the common forms of putrefaction-bacteria one part to four or five hundred is required. Koch's observations have proven the inertness of carbolic acid when dissolved in oil. In this form, it is perfectly harmless to both spores and developed bacteria. It can, hence, not be used for the disinfection of instruments or the hands, in an oily solution. But in the interior of wounds the carbolated oil is not so inert, for, under these circumstances, some of the acid is yielded by the oil to the water of the moist surface in which it dissolves to form an active solution. Dissolved in alcohol, carbolic acid is likewise wholly inert. Of other agents, Koch found very few capable of destroying *spores*. The only ones that could be relied upon to accomplish this within less than twenty-four hours were permanganate of potassium (five per cent.) and osmic acid (one per cent. solution). A five per cent. solution of chloride of iron destroyed them within six days, which neither sulphate of copper nor chloride of zinc were competent to do.

The latter agent has been much overrated by surgeons, for its presence to the extent of half of one per cent. did not even hinder the development of the bacillus anthracis. Hydrochloric acid (two per cent.), sulphuric acid (one per cent.), chromic acid (one per cent.), boracic acid (five per cent.), tannic acid (five per cent.), benzoic acid (concentrated), dissolved in water, as well as a host of other substances, were found inert with reference to spores. On the other hand, we learn by his experiments that certain substances, while not very destructive to bacteria, can prevent their growth by their presence in minute quantities; for instance, allyl alcohol, one part in 167,000; mustard oil, one in 33,000; arsenite of potassium, one in 10,000. (This last we doubt, but would not throw it out on our own experiments, for the fault may be with us in some faulty manipulation.) Researches confirming the above have been conducted by Arloing and Thomas, but in the researches of these gentlemen it is difficult to learn whether they distinguished strictly between the spores and the developed forms. They assign to nitrate of silver a disinfectant value second only to mercuric bichloride. Sulphurous acid, an agent much used for disinfection on a large scale, was found by Koch quite unreliable. Its action on spores is very feeble. While it can kill the developed forms, if present in the air to the extent of one per cent. (by volume) within twenty minutes or less, it fails to penetrate into the interior of the thicker masses, and its effect is therefore uncertain.

Before the rôle of bacteria was understood, any substance was called a disinfectant, provided it destroyed or masked the smell of putrefaction. Subsequently, it was attempted to learn whether a so-called disinfectant destroyed the bacteria themselves. But the criterion at first chosen was imperfect. The different observers simply added the agent to the bacterial fluids, and watched with the microscope the effect upon the movements. There are many kinds of micro-organisms which never possess any movements, while when vital movements do exist, their arrest is by no means indicative of death. The only criterion of the death of bacteria is the absence of their power of multiplication when transplanted into the proper soil. By the use of appropriate methods, based on this principle, the foregoing results have been obtained.

Fumigation with sulphur has been found to be inefficient. Dr. Bucher, of Munich, has made experiments with it and found that the anthrax germs resisted the action of one ounce of sulphur burned in an air-tight chamber of one cubic yard for three days without suffering in their virulent qualities.

TRANSLATIONS.

IODOFORM AS A SPECIFIC FOR PULPITIS AND PERIOSTITIS.

BY G. WOERNER, FREUDENSTADT.

[Translated from the Zahntechnische Reform, February, 1884.]

For several years past a revolution has been taking place in the treatment of teeth having diseased pulps and in cases of periostitis, which does almost entirely away with the strong poisons formerly applied, and which enables us in most cases to save teeth that were formerly hopelessly lost, or at least deprived of their principal nourishing organ, the pulp. One of the first among those who deviated from the old method was unquestionably Mr. Witzel, of Essen, with whose phenol preparations favorable results were obtained. However, as with every novelty, when the idea has been given, improvements and alterations follow; one supplants the other. And so we are not surprised that, in a short time, a series of methods have been recommended which arrived at similar purpose, for instance, Wickersham's liquid, eucalyptus oil, etc., but not one has become universal. About two years ago a Mr. Skogsborg, dentist in Stockholm, succeeded in making an iodoform preparation that is excellent in its antiseptic qualities, and which was also adopted by Mr. Witzel. To these two authorities dentists are indebted for having made their acquisitions universal. As now several years have passed since iodoform paste was introduced into practice, though till now little was made known as to how it had worked during this time, it appears as if not a sufficient number of colleagues have made experiments with it, or that the result of their experiments had not proved satisfactory. It is this circumstance which leads me to make public my own experiments. I have used iodoform in all stages of caries, with equal success, and proceeded as follows: cavities where there is a sufficient layer of healthy dentine around the pulp, and no pain has been felt, are immediately excavated, the cavity is suitably shaped to receive the filling, all humidity removed by use of alcohol and then filled. In cavities where the pulp is still covered by a softened tooth-bone, but still pain is now and then felt, especially when excavating, I insert for a few hours a solution of carbolic acid, and fill after preparing and drying the cavity. Should the pulp be exposed by the instrument, or has this already been, the case, I put in a coating of iodoform paste and then fill temporarily. With an already inflamed pulp the pain ceases shortly after inserting the iodoform paste; it can then, in a few days, be coated over with iodoform cement and filled. In cases where the pulp has become gangrenous, and periostitis has ensued, I apply arsenic, remove the pulp, and carry the paste into the root canals, but do not fill until all inflammation has ceased. With teeth where the pulp, changed to a jelly-like mass, has formed an abscess, the first thing is cleansing of the root-canals by syringing and wiping out with a nerve broach wound around with cotton; then I insert a few crystals of hyper-manganate of lime into the roots and fill later the roots with iodoform cement. Failures are a rarity. I should be pleased if other dentists would publish their observations. The iodoform paste I have made according to the following recipe.

℞. Iodoform pulv. subtiliss, 5.0
Acid salicyl, 3.0
Morphium muriat. 1.0
Glycerin
Ol. Menthae, gtt. V.
Fiat pasta.
Label—For external use.

The iodoform cement I prepared by mixing zinc cement with half the quantity of iodoform paste.

CORRESPONDENCE.

My Dear Sir:

. . . .

You refer to your use of the mercuric chloride. In my own case (Riggs' disease) it was the only thing that did good, but the best results did not develop *till* ten or fifteen days after the *heroic* treatment was stopped. I do not consider that the antiseptic has any curative properties whatever. The system has the elements in and of itself, but sometimes gets overpowered and needs help to "kick the intruder out," or "strangle him," which is the office of medical aid. Bro. ——— rapped knuckles with me once for talking of "vitality," and quietly asked what it was, just as though I knew. Well, there is a something, call it what you will—a normal "concert pitch"—to which the human body is brought up, that renders it proof against death and disease, of which we have constant proof;

and while the *mind* and *body* are in this healthy normal condition, and all their many octaves are in tune, "all the powers of hell," in the shape of "bugs or infection," will find that "organism" poor hunting ground. But if, by work or worry, we lower the standard and bad blood feeds the tissues (teeth as well), then the little devils who were there all the while, "waiting on the fence," jump down and pitch in.

We must get rid of the notion that certain articles are curative in and of themselves. This idea is what has fed the quacks, from the time of the "witch of Endor," to the present time (and we have as many quacks in the profession as out). Dame Nature is ready and will do the work, only once in a while she wants a little aid in "cleaning house." This aid is what the intelligent dentist and physician should study to apply in the right direction, and at the right time. For instance, if you have a patient come to you with pyorrhea alveolaris, and, on examination, you find a flably condition of the muscles and perhaps an almost bloodless look, would you expect *any* local treatment to be responded to while the other conditions of the system were suffered to go on unchecked, and those tissues fed with blood that was loaded with effete material that should have long ago been *cast out.* A treatment that would benefit this patient would do no good to another patient suffering from the same disease, but with a full habit and in which the trouble would SEEM *to be merely local.* So, in my opinion, there are "several roads to Rome." You can give no unfailing recipes for "numbskulls" to work by, but tell them, like Opie, the artist, when asked how he mixed his colors to produce such fine work, "I mix them with brains." Tell them to mix the antiseptics well with brains and a constant habit of observation, and in time they will see the "light ahead."

Your point that the mercuric chloride prepared the way for future medication is well taken, and one which is often lost sight of. I judge, from what I observe about me here, many fall into the "bug theory" because they think, if this is true, then all we have to do is "kill 'em," and the job is done, and we get a nice fee and pass on, like the barber, to the next. Not long ago I heard a young student of Harvard Dental College complaining because the students were put through a medical drill, as being a loss of time. If the dentist does not want medical knowledge, who does? . . . .

Did you ever note the action of an external application of a mercurial on an open sore? You will almost always find that deepened look, produced by the inflammatory action of the caustic on the tissues, which causes the margins to swell or tumify, giving a look of depth to the affected spot. A mild dressing that will not harbor bugs will help bring about a cure.

A case in point: A young lady received a severe burn on the ankle; grew worse, in spite of treatment; her doctor, an "anti-bug" fellow, brought me a portion of a white coating which covered the wound. I found "fungi" in large numbers; prescribed an ointment of mercuric oxide. On its application, it began to look better, but in time went back worse than ever. I found that the dressing was removed to satisfy the curiosity of every visitor—sometimes ten or twelve times daily. The mercurial was again applied thoroughly, the wound dressed with antiseptic cotton and closed from the contact of external air, and it healed in a few days. Do you think strange that I say mix these things with brains? . . . . .

SELECTIONS.

FERMENTATION IN THE HUMAN MOUTH.

The Influence of Antiseptics, Filling Materials, Etc., upon the Fungi of Dental Caries.

BY DR. W. D. MILLER, BERLIN, GERMANY.

[From the Independent Practitioner, June, 1884.]

Having established upon an experimental and scientific basis the fact that caries of the teeth is, to a certain extent, the direct result of the action of ferment acid or acids* upon the tissue of the tooth, followed, particularly in the case of the dentine, by the action of the ferment organisms themselves upon the decalcified tissue, it becomes a matter of the first importance to determine, first, by what means we may counteract the action of the acids or prevent their production; second, by what means we may save the already decalcified dentine from complete destruction.

Evidently there are three methods by which the desired end may be partially obtained:

1. By repeated, thorough, systematic cleansing of the oral cavity

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*The chief work in the production of caries is performed by lactic acid; other acids are only auxiliary factors.

and the teeth, we may so far reduce the amount of fermentable substances in the mouth, and the number of ferment organisms, as to materially diminish the production of acid. This is so self-evident that it needs no further comment.

2. By the repeated application of alkaline substances we may, to a certain extent, neutralize the acids before they have acted upon the teeth to any considerable degree.

3. By a proper and intelligent use of antiseptics we may destroy the organisms themselves, or at least render them inactive. It is this method which is especially applicable in the second stage of dental caries (*i. e.*, the stage which follows the decalcification), and to which we will here give exclusive attention. We must, however, constantly bear in mind that by whatever method we proceed, a previous thorough cleansing of the teeth is absolutely indispensable. There is no known solution, alkaline or antiseptic, applicable in the human mouth, which will penetrate between the teeth or to the bottom of fissures and cavities, when these are filled with food, in sufficient quantities to have any appreciable effect. Therefore, before all antiseptics or alkaline washes, come the toothbrush, toothpick, and floss silk.

In my experiments for determining the action of various antiseptics upon the fungi of tooth caries, it appeared to me that by allowing the antiseptic to act upon the fungi in their natural medium, saliva, I could obtain results of more practical value than by experimenting upon them in artificial solutions, and in pure cultures, neither of which ever occur in the human mouth. Furthermore, since the fungi can attack the teeth only after a partial decalcification, we have in the first place to demand of an antiseptic, not so much that it destroys the fungi, as that it prevents the production of acid by them.* Consequently, if an acid reaction failed to appear in a solution of saliva and sugar to which a certain antiseptic had been added, as soon as in a like solution to which no antiseptic had been added (control), it was taken as evidence of the activity and value of the antiseptic used. This method could of course be used only with substances having a neutral reaction. The solutions were also subjected to a microscopical examination, to render the evidence doubly sure.

In the following table I have indicated the percentage of each antiseptic experimented upon which must be present in a sweetened-

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*The production of acid may be taken as synonymous with the development of the fungi, though the failure of the acid reaction to appear after a certain length of time does not necessarily indicate that the fungi have been *devitalized*.

saliva solution, to prevent the appearance of an acid reaction in twenty-four hours, or in case of alkaline or acid antiseptics, to prevent the development of the characteristic fungi in the same time.

For example, if to 100,000 parts of sweetened saliva we add one part of bichloride of mercury, the solution will not be found acid after the lapse of twenty-four hours, even though the control became sour in four or five hours. If we add only one part to 500,000, the acid reaction will appear somewhat later than in the control.

This table is designed to show the comparative strength of the antiseptics most commonly used. The action of the antiseptics having an acid or alkaline reaction upon the fungi, was determined by the use of the microscope alone.

	Production of Acid (Development of Fungi)	
	Prevented.	Retarded.
Bichloride of mercury,	1–100,000	1–500,000
Nitrate of silver,	1–50,000	1–100,000
Iodoform,	1–5,000	1–10,000
Naphtaline,	1–4,000 (?)	1–9,000
Iodine,	1–6,000	1–15,000
Oil of mustard,	1–2,000	1–5,000
Permanganate of potas.,	1–1,000	1–2,000
Eucalyptus oil,	1–600	
Carbolic acid,	1–500	1–1,000
Hydrochloric acid,	1–500	1–1,000
Phenylic acid,	1–200	1–500
Liquid of Agate Cement,	1–250	
Liquid of Excelsior Cement,	1–225	
Lactic acid,	1–125	1–250
Carbonate of sodium,	1–100	1–200
Salicylic acid (Conc. alcohol sol.),	1–75	1–125
Alcohol,	1–10	1–20

The experiments show that bichloride of mercury is about two hundred times as powerful as carbolic acid, and demonstrate very clearly the mistake of substituting weak solutions of this antiseptic (1–1,000, as I have seen recommended) for concentrated carbolic acid. One one-thousandth is only one-fifth as powerful as pure carbolic acid, which in many cases may be used with impunity. It is consequently useless to attempt to introduce the sublimate solution for the purpose of sterilizing root canals, cavities before filling, etc., unless we may use at least a one-half per cent., if not a one per cent. solution. I see no reason, however, why this may not be done. In a few cases I have used a one per cent. solution for treating root canals, and do not hesitate, particularly with the rubber dam adjusted, to wipe out cavities before filling with a two per cent. solution, and see no possible evil which could result from it. A well-known physiologist in Berlin has told me that he uses a one per cent. solution in his own mouth for aphthæ, and with excellent results. We should not, however, overlook the fact that a one per cent. sublimate solution is only one-fifth as powerful as pure iodoform.

As a mouth wash I have frequently used a one-tenth per cent. (1–1,000) solution myself, and have seen no bad results from it; I would not, however, recommend it to my patients in this strength. It has, besides, for me, an exceedingly disagreeable and lasting taste, which it is difficult to disguise, and produces an immediate increased secretion of saliva and mucus, which is very annoying. A one-fiftieth per cent. solution (1–5,000) may eventually be brought into use; in this concentration it is four times as powerful as a one per cent. solution of carbolic acid. The very high antiseptic power of nitrate of silver is particularly noteworthy. Why may it not be employed in place of the much more dangerous mercuric chloride?

The action of tobacco upon the fungi is worthy of notice. Five grammes of old Virginia plug were boiled fifteen minutes in fifty c. c. of water, the loss by evaporation being constantly replaced; the decoction was then filtered, and a portion added to an equal volume of saliva with sugar. This produced a mixture scarcely stronger than that which many veteran chewers carry around in their mouths all day, and in it the fungi led only a miserable existence.

Much more remarkable, however, was the action of tobacco smoke upon the fungi; the smoke from the first third or last quarter of a Colorado Claro cigar being found amply sufficient to sterilize ten c. c. of a beef-extract-sugar solution, previously richly infected with caries fungi. . . . . . .

In consideration of the strong antiseptic power of tobacco smoke, we might be inclined to infer that tobacco smokers should never suffer from caries of the teeth; it is evident, however, that there are very many points in the dental arch to which the smoke never penetrates.

In the preparation of cavities for inserting fillings, it is naturally often next to impossible to remove all the carious dentine, and in all such cases it is especially desirable that the filling material itself should possess antiseptic properties, since we, in using such a material, not only destroy those organisms existing in the carious tissue, but the material, if it remains permanently antiseptic, retards the working of the ferment organisms from without, and the appearance of secondary decay. We need, therefore, a material for filling which is not only antiseptic at the time of insertion, but which remains permanently so after being inserted.

I have endeavored to determine the relative antiseptic power of different filling materials (cements, amalgams, etc.), not only at the moment of mixing, but after they were thoroughly dry, after they had lain some hours in sweetened saliva, and after they had been an indefinite time in the human mouth.

A large number of miniature test-tubes (homeopathic pill tubes) were provided with cotton stoppers and sterilized. Into each was brought one-half c. c. of beef-extract-sugar solution, previously infected with carious fungi (pure culture). To the first tube was added a small drop of a one per cent. sublimate solution; the second tube was left untouched, and into the third, fourth, fifth, etc., were brought the filling materials whose antiseptic virtues were to be tested; these were in the form of cylinders two m. m. in diameter, and three m. m. long; if old fillings from the mouth were used, pieces were taken having approximately the same size.

These tubes now being placed in the incubator, their contents became cloudy one after the other. In those tubes which contained fillings of but slight antiseptic power, the development of the fungi proceeded rapidly, and the cloudiness soon appeared. If, on the other hand, the filling was strongly antiseptic, the development of the fungi was hindered and the cloudiness appeared later. The first tube to which the sublimate solution had been added of course remained clear, and by comparing the others with this it was easy to see just when the turbidity began to show itself; the second tube, containing no antiseptic and no filling, served as control, and the space that intervened after the control became turbid till any one of the other tubes became turbid, was a measure of the antiseptic power of the material in that tube.

As the result of a great number of experiments, I have been able to get together the following table:

When the control tube becomes turbid in five hours, then:

A tube containing an old oxy-phosphate filling becomes turbid in	5 hours.
" " " oxy-chloride " " "	5 "
" " a gold cylinder becomes turbid in . . .	5 "
" " a Hill's stopping cylinder becomes turbid in .	5 "

A tube containing	an amalgam cylinder (kept 12 hours in saliva) becomes turbid in	$5\frac{1}{7}$	hours.
“ “	an agate cylinder (kept 12 hours in saliva) becomes turbid in	$5\frac{1}{4}$	“
“ “	an old amalgam filling becomes turbid in	$5\frac{3}{10}$	“
“ “	an amalgam cylinder (mixed dry) becomes turbid in	$5\frac{3}{8}$	“
“ “	an amalgam cylinder (mixed wet) becomes turbid in	$5\frac{1}{2}$	“
“ “	an oxy-phosphate cylinder (12 hours in saliva) becomes turbid in	$5\frac{1}{2}$	“
“ “	an amalgam cylinder (12 hours old) becomes turbid in	$5\frac{2}{3}$	“
“ “	an old filling of tin and gold becomes turbid in	$5\frac{4}{5}$	“
“ “	an oxy-phosphate cylinder (12 hours old) becomes turbid in	6	“
“ “	an agate cylinder (12 hours old) becomes turbid in	$6\frac{1}{4}$	“
“ “	an iodoform cement cylinder (12 hours in saliva) becomes turbid in	$6\frac{2}{5}$	“
“ “	a pyrophosphate cylinder (mixed dry) becomes turbid in	$7\frac{1}{8}$	“
“ “	a pyrophosphate cylinder (mixed wet) becomes turbid in	$7\frac{3}{8}$	“
“ “	an oxy-chloride cylinder (12 hours old) becomes turbid in	9	“
“ “	a piece of dentine from a tooth impregnated by copper amalgam filling becomes turbid in	11	“
“ “	an iodoform cement cylinder (12 hours old) be-turbid in	12	“
“ “	an iodoform cement cylinder (fresh) becomes turbid in	—	“
“ “	a globule of mercury becomes turbid in	—	“
“ “	a cylinder of black oxide of mercury becomes turbid in	—	“
“ “	a cylinder of any copper amalgam becomes turbid in	—	“
“ “	any old copper amalgam filling becomes turbid in	—	“
“ “	a cylinder of oxy-chloride (fresh) becomes turbid in	—	“

The (—) signifies that the solution remained permanently clear.

We see from these results that the only filling at present in use which exerts a continual anti-ferment* action upon the walls of the tooth and its immediate surroundings, is the old copper amalgam; not only that, but the very substance of the tooth containing such a filling itself becomes antiseptic, a piece of bluish or bluish-green dentine from such a tooth very powerfully retarding the development of the fungi, and, indeed, in two cases, completely destroying them. Secondary decay in such a case would be next to impossible, where anything like cleanliness was observed.

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*I use the terms anti-ferment and anti-septic interchangeably, though the former is perhaps, preferable, since we are treating of ferment, and not septic organisms.

This result is well supported by observations which I have had abundant opportunity to make for the last five years, here where this material is so extensively used, and I do not hesitate to say that if our only object is to check the destruction of tissue by caries, there is no material at present in use, with which this object may be so surely accomplished as with a good copper amalgam. It is a material, however, which I have never used, though I am not aware of any bad effect produced by it beyond the discoloration of the tooth. Skogsberg's iodoform cement came into my hands too late to complete the experiments with it. It has undoubtedly strong antiseptic properties, which it does not completely lose even when exposed to the saliva, and might no doubt be used to great advantage as a foundation for permanent fillings. Old fillings of tin and gold possess slight antiseptic power, still less (almost zero) old amalgam fillings (not copper). The very inconsiderable power of amalgams to prevent the development of ferment fungi is a source of some surprise, since we have been accustomed to look upon them as very active in this respect. It is probably a mistake to attribute the hardening of dentine under amalgam fillings to the antiseptic action of the amalgam, since, in the first place, it possesses this power to but a slight degree, and in the second place the hardening may take place under fillings of gutta-percha equally well. If we dry the cavity but indifferently well, and then choose a piece of gutta-percha which we think will about fit the cavity, warm it and stuff it into the cavity, we of course can expect only bad results. If we proceed as follows we will obtain excellent results, as I have seen time and again: Adjust the dam, excavate carefully, especially the margins, wash with a strong antiseptic, dry thoroughly with bibulous paper and then with the hot-air syringe, till the surface of the dentine becomes whitish, paint with a thin solution of copal varnish, dry again with warm air, then put in the gutta-percha in small pieces one after the other, being *sure* that each piece sticks to its place, especially along the margin, just as if you were making a filling of gold. A piece which has once moved in its place must not be allowed to remain, as a leak will be the result. Remove such a filling after two years, and the cavity will often be found in an excellent condition for a gold filling.

The oxy-chlorides, when first mixed, are powerfully antiseptic, but soon lose their energy when exposed to the action of saliva.

The oxy-phosphates are very much inferior to the oxy-chlorides in anti-septic power, and should never be used in cavities where there is much soft dentine. This conclusion is borne out by my own experience in practice, and by that of others with whom I have conversed on the subject. Dr. Paetsch first called my attention to the disastrous results of such a practice, and his testimony was confirmed by that of Dr. F. P. Abbott and others.

It must not be expected that the results given in the above table are absolutely free from error. The experiment is attended with more difficulties than are at first sight apparent; especially does the sterilization of the filling materials themselves involve much time and labor, and the results are not always constant; this was especially the case with iodoform cement. Amalgams and phosphates gave quite constant results. The tests with some of the materials were made over twenty-five times; with others, such as copper amalgams, where there was no doubt as to the result, only a few experiments were made.

Caries of the teeth, except in the later or last stage, is the result of a ferment process, and the organisms found in the deeper parts of decaying dentine, which I have isolated and obtained in pure culture, are ferment organisms. The decomposition of the pulp and contents of the root canal, attended by bad-smelling products, is, on the other hand, a putrefactive process, in which entirely different species of fungi are concerned. Whether or not the results which I have obtained for the fungi of caries would apply equally well to those putrefactive fungi, is a question which can be settled only by experiment upon pure cultures of the same.

Although I have now, as I think will be granted, established upon a sure basis a fact that caries of the teeth may result directly from the action of acid producing fungi in the presence of fermentable carbohydrates, the conclusion would hardly be justifiable that, by keeping the mouth constantly and perfectly free from all fermentable substances, or by repeated application of antacids or antiseptics to all parts of the teeth, or by all these means together, we could ever banish dental caries from the oral cavity. A most powerful influence, which we do not well understand, is exerted by the nutritive processes in the teeth themselves.

I am assured by men who have grown old in the practice of dentistry, that mouths which have long been under their observation, and which practically have been completely free from caries for years, at once, on account of some sudden change of health, show a general breaking down or crumbling of the teeth, *en masse,* in the space of a few weeks. It has also been my experience that patients who have been dismissed by their dentists in America, with the assurance that according to previous experience their dentures would require no treatment for one or two years, have come to me a few weeks later with teeth looking as though they had not been under the hands of a dentist for years. Some say the ocean voyage spoiled their teeth; others attribute it to a change in the climate, food, health, etc.

At any rate, we have here a cause which lies without the domain of both bacteria and acids (either ferment or otherwise). The lime-salts of the teeth are supposed to form, with the organic matter of the tooth, a definite chemical compound, and it is probably due to this fact that simple salts of lime are so much more readily soluble in weak acids than pulverized tooth-bone, or that the tartar upon the teeth is so much more easily soluble than the teeth themselves; so that when any one rinses his mouth with vinegar, and afterwards finds lime in the vinegar, we know that the lime, in by far the greater part, if, indeed, we may not say altogether, came from the tartar. Now, though there is no positive evidence for the supposition, it is certainly not altogether improbable that, as a consequence of certain derangements in the nutritive functions of the teeth resulting from a change of health, etc., etc., a dissolution of the affinity between the lime-salts and the organic matter may take place, thus setting free the easily soluble lime-salts, which are then carried away in solution or washed out mechanically.

This is a supposition only, which I bring forward because facts in this case are absolutely wanting. If it should, perchance, contain a trace of truth, then adult and pulpless teeth should be less subject to these *sudden* attacks of caries than young teeth with living pulps.

There still remains much hard work to be done, before the subject of dental caries may be dismissed as having received a final solution in *all its different phases.* There are men enough in the profession, however, who are willing to work, and who do not shrink from the tasks yet to be performed.

SALICYLIC ACID A CURE FOR TIC DOULOUREUX.

We frequently meet in our practice cases of tic douloureux, that often so exceedingly painful neuralgia of the fifth nerve, where an operation seems to promise the only radical cure. If we hear of a remedy which is said to have the same effect as the surgical interference, we become doubtful; but if no less reliable an authority than Prof. Nussbaum (*Munich, Aerztl. Intelligzbl., 38, 1883,*) assures us of the fact, our hope increases. Recently a number of such cases had been sent to N. for the purpose of having the operation performed, and, after a number of carefully instituted experiments, this great surgeon recommends a trial with salicylic acid before proceeding to stretching or to resection of the nerve. In all the recently-sent cases he first tried this remedy, and he found it in every one a radical cure; not only a palliative effect, but really an utter disappearance of the painful disease was the result in every case. Especially in cases of rheumatic nature, N. is positive of having discovered in salicylic acid a specific for tic douloureux. He administered the drug in the following manner: ℞. Acidi salicylici, 0.2, gr. 3⅓; Sodii salicylatis, 2.0, gr. 32; M. ft. pulv. Within 24 hours the patient takes from four to six of such powders.—*Med. and Surg. Reporter.*

With regard to the artificial production of decay under septic conditions, we should be only too delighted if we could succeed in doing what Dr. Miller appears to have done; in fact, so delighted were we when we read, about a year ago, in one of Dr. Miller's papers, of what he had done that we wrote to congratulate him and to ask him exactly how he had done it. He wrote back a very kind letter, giving us the information we had asked for, and we proceeded to repeat the experiments as nearly as we could from his description, but we could not get the same result. We placed the teeth in the mixture of saliva and bread, and did exactly as Dr. Miller directed us; but though some softening took place it was certainly not caries. If any one would like to investigate this point for himself we have the teeth so softened here for examination.

Then, with regard to these various organisms being only different forms or stages of growth of the same fungus, we have given you definite and detailed facts. We have implanted leptothrix, micrococcus, bacillus, and the oval and rod-shaped bacteria, each by itself, n little flasks, and they have grown and continued to grow for a very long time, and, as Mr. Milles has expressed it, they have always "bred true." The bacillus has never gone on to produce leptothrix, nor have the micrococci produced bacteria, and therefore we feel justified in asserting that these organisms are not the same thing in different stages of growth, else we should have succeeded in tracing some of these changes. So that here again we put forward a fact, and not merely an assertion. . . . .

In reply to Dr. Cunningham, we may say that we do not look upon Dr. Miller at all in the light of an opponent, but rather as a fellow investigator. We have arrived at pretty nearly the same points. Dr. Miller thinks there is a certain amount of tissue affected beyond that invaded by the micro-organisms. I do not think so, nor does Mr. Milles, but we do not consider this a very important difference; on the other hand, we consider the presence of the micro-organisms a very important factor, and so does Dr. Miller. . . .

In conclusion, I should like briefly to sum up what we have said. The micro-organisms are there; there is no doubt about that. The micro-organisms which are present can produce, and do produce, an acid. An acid and micro-organisms together can and do produce caries. Whether this can be imitated out of the mouth really does not much matter. It would be very satisfactory if one could produce caries out of the mouth, but this is not really necessary to establish our point.

One other thing which I should like to have no mistake about is this, that the principal portion of the acid in the mouth is produced by fermentation, and that those acids which are not so produced, and which are evanescent, are not in any way blameable with caries. The food gets lodged between the teeth, acid is formed, the enamel is destroyed, the micro-organisms invade the dentine, and the rest follows.—ARTHUR S. UNDERWOOD—Transactions of the Odontological Society, Great Britain.

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The inflammation excited by the presence of bacteria often results in a great aggregation of *living cells* in the tissue affected. These may so act as to repel the continued advance of the fungi, which straightway perish, and the affection issues in healing and cicatrization. The fixed tissue-cells of the region may likewise act so as to check the development of the bacteria, and may further suffice to make up any loss of tissue by their regenerative activity. If this does not happen the bacterial invasion continues to advance.—*Ziegler.*

SOCIETIES.

AMERICAN DENTAL ASSOCIATION.

The twenty-fourth annual session of the American Dental Association will be held at Saratoga Springs, N. Y., commencing at 10 A. M., on Tuesday, August 5, 1884.

GEO. H. CUSHING, *Rec. Sec.*

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

The second annual meeting of the National Association of Dental Examiners will be held at Saratoga Springs, N. Y., on Friday evening, August 8, 1884. All Boards of examiners are urgently requested to send representatives to this meeting, as matters of importance are expected to be brought before it.

GEORGE H. CUSHING, *Secretary.*

TO MEMBERS OF THE CONNECTICUT VALLEY DENTAL SOCIETY.

As no action was taken at the last semi-annual meeting upon appointment of delegates to the American Dental Association, and as the active members are entitled to certificates to the number of thirty-one, those wishing credentials can apply to Dr. W. F. Andrews, Secretary, Springfield, Mass.

A. M. ROSS, *President C. V. D. S.*

HARVARD ODONTOLOGICAL SOCIETY.

The sixth annual meeting of this society was held at Young's Hotel, Boston, June 28, 1884, at 3 P. M.

Annual oration by E. H. Smith, D. M. D., Boston.

Essay, "Incidents of Office Practice," E. C. Briggs, M. D., D. M. D.

Dinner.

The following officers for the ensuing year were elected:

President, F. E. Banfield, D. M. D., Boston.

Secretary, A. J. Colgan, D. M. D., Boston.

Treasurer, W. E. Page, D. M. D., Boston.

Executive Committee, A. J. Colgan, D. M. D., E. H. Smith, D. M. D., E. C. Briggs, M. D., D. M. D.

Annual Orator, J. W. Smith, D. M. D., Newport, R. I.

Annual Essayist, A. J. Colgan, D. M. D., Boston.

HARVARD DENTAL ALUMNI ASSOCIATION.

The thirteenth annual meeting of this Association was held in Young's Hotel, June 24, 1884, the President, Dr. F. E. Banfield, in the chair. After the usual exercises and dinner, the following officers for the ensuing year were elected: President, Dr. J. G. W. Werner; Vice-President, Dr. T. O. Loveland; Secretary, Dr. Charles Wilson; Treasurer, Dr. W. E. Page.

DR. W. E. PAGE, *Sec'y.*

MASSACHUSETTS DENTAL SOCIETY.

The nineteenth semi-annual meeting of this society was held in Boston, June 5 and 6, 1884.

The various officers and committees made reports.

The meeting was called to order by the President, Dr. D. M. Clapp, Boston, June 5, at 11 o'clock, A. M.

Essay, by Dr. W. C. Starbuck, of Jamaica Plain—"The Possibilities of Hereditary Transmission of Oral Lesions."

Essay, by Dr. T. D. Shumway, Boston—"The Scientific Method in Filling Teeth."

Essay, by Dr. G. F. Waters, Boston—"Some Facts in Dental Caries."

Essay, by Dr. E. C. Leach, Boston—"Successes and Failures in the Applying of Artificial Dentures."

Essay, by Dr. C. G. Davis, New Bedford—"Methods of Tooth-saving."

Essay, by Dr. C. T. Stockwell, Springfield—"Micro-organisms and Caries," with extracts from a paper by A. S. Underwood, of England.

"Seabury's Method of Working Celluloid and Vulcanite by Super-Heated Steam," with illustrations and exhibition of apparatus, by Dr. F. W. Seabury, Providence, R. I.

Essay, Dr. G. O. Kinsman, Cambridge—"Sixth-Year Molars."

Clinic, by Prof. Thomas Fillebrown, Boston—"Hand-Pressure Filling."

Voted, That the Secretary be empowered to procure a fac-simile plate of the old certificate of membership, which was destroyed by fire.

DR. W. E. PAGE, *Secretary.*

PENNSYLVANIA STATE DENTAL SOCIETY.

The sixteenth annual session of the Pennsylvania State Dental Society will be held at Wilkesbarre, July 24, 1884, and continue in session three days. The Wyoming Valley Hotel offer special rates to delegates and their families. Orders for excursion tickets over all railroads, or other information, can be had by addressing

W. H. FUNDENBERG, *Cor. Sec.*

958 Penn. Ave., Pittsburg, Pa.

MEETING OF DELEGATES.

Delegates to the NATIONAL, and others who may act in a representative capacity, will meet in Washington City, July 22, at the Ebbitt House, where reduced rates have been made. Reduced railroad rates may be obtained by delegates uniting from a State or section.

Everything indicates a large meeting for organization. Enough States have elected delegates to insure a good attendance and a profitable meeting. The acceptability of the plan has been shown by the large number of favorable responses from every section of the United States. The East, the West, the South and the North will come together in one common cause and for one common purpose.

An organization will be put forth that will grow to the grandest proportions, reflecting honor upon the name of "American Dentistry."

B. H. CATCHING, *Correspondent.*

Atlanta, Ga., June 14, 1884.

MONTHLY LIST OF PATENTS.

For Inventions relating to Dentistry, bearing date June 24, 1884. Reported expressly for this Journal by Louis Bagger & Co., Mechanical Experts and Solicitors of Patents, Washington, D. C.

299,861. Dental vulcanizer—F. W. Seabury, Providence, R. I.
300,600. Dental rubber dam—L. M. Halsey, Brooklyn, N. Y.
300,538. Dentist's chair—J. B. Waring, New York, N. Y.
301,055. Dental-floss holder—G. E. Greene, Gardner, Mass.

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ORIGINAL COMMUNICATIONS.

AN IMPROVED APPLIANCE IN THE PHYSIOLOGICAL TREATMENT OF CLEFT PALATE.

BY HENRY A. BAKER, D. D. S.,

Lecturer on Oral Deformities, Boston Dental College.

[Read before the Massachusetts Dental Society, December 13, 1883.]

It has usually been said that lesions of the palate arise from one of two causes, that is, they are either congenital or accidental.

Congenital cleft of the palate was as commonly treated surgically as by mechanism. The former treatment has been nearly or quite abandoned in recent years for two very good reasons: First, it is a very painful one for the patient, and difficult for the operator, and a failure of closure is largely in the majority. Second, it universally fails to improve the speech even after a successful closure.

Notwithstanding the above facts, some physicians recommend staphyloraphy. They must certainly do so from a want of knowledge of the anatomy and physiology of the vocal organs and their use in the mechanism of speech, which is the production of sound, and its direction through the nasal passage or the mouth at will, being controlled by certain organs whose modification and resonance enable us to form what we term articulate speech.

One of the most important aids in producing the above results is the soft palate. This organ is lifted up and comes in close contact with the pharyngeal wall, thus shutting off the nasal passage, which is absolutely essential in producing all excepting nasal sounds. After the operation of staphyloraphy such a closure is impossible, owing to the soft palate having been made too short and tense; hence defective speech invariably follows.

Accidental lesions of the palate, as the name suggests, are caused either by accident or disease. These cases may be successfully treated with a very simple appliance, while the same amount of skill exercised on a congenital cleft would have no beneficial result. This may be accounted for by the fact that in the former case the patient had learned to articulate distinctly, and use the organs of speech efficiently and correctly, while persons who are thus deformed from birth are obliged to learn the art and methods of articulation by slow and painful processes. The organs require the training which is necessary for one who acquires a new language. Hence the appliance for relief should not only fill up the gap in the defective palate, but should also be so constructed as to work on physiological principles in harmony with the natural movements; that is to say, it should be under perfect control of the surrounding muscles. It is manifest, therefore, that the success, even of the most scientifically adjusted instrument, depends largely upon the coöperation of the patient who uses it.

As the above malformations are classed as congenital, and accidental, the appliances for their relief are classed as follows: obturators and artificial vela. Among the former Dr. William Suersen is the inventor of one which has created much interest. The most important and significant advance in this department of science, however, made itself manifest in attempts to form an artificial velum, and Dr. Stearns was probably the first to introduce its true principle. I speak of these two investigators, Suersen and Stearns, because I am led to think that they have brought before the profession the most scientific apparatus of each class, and it is from a consideration of both of their appliances that I have evolved the principle, in explanation of which this paper has been prepared.

Suersen says: "In order to be able to pronounce all letters distinctly it is accordingly necessary to separate the cavity of the mouth from the cavity of the nose by means of muscular motion. That separation is, under normal conditions, effected, on the one hand, by the velum palati, which strains itself (consequently by the levator and tensor palati), but, on the other hand, also by a muscle, which to my knowledge has not yet received a sufficient amount of attention in connection with these operations. I mean the constrictor pharyngeus superior. This muscle contracts itself during the utterance of every letter pronounced without a nasal sound just as the levator palati does. The constrictor muscle contracts the cavum pharyngo-palatum, the pharyngeal wall bulging out, and it is chiefly on the action of this muscle that I base the system of my artificial palates."

It will be noticed that Suersen admits that the levator palati is an important organ of speech, yet he makes no provision for utilizing it as such, and only provides for the superior constrictor muscle coming in contact with the distal surface of his appliance to shut off the nasal passage. In my opinion, for the patient afflicted with congenital cleft to acquire perfect articulation with such an appliance (even if it be possible), years of application and training of this muscle would be necessary. A little reflection will show that this muscle, besides performing its own function, must be trained to fulfill those of the velum palati, levator palati, and tensor palati. But in an *accidental* lesion this may be all that is necessary, as the patient having previously learned to articulate distinctly, and having this deformity come upon him afterwards, the superior constrictor muscle would, no doubt, be sufficiently developed to perform that function.

Sir William Fergusson, in his report of a dissection made by him of a cleft palate in 1844, states distinctly that the superior constrictor was very full, and he also claimed for that muscle very decided forward action in deglutition. It was in the year 1841 and 1842 that Dr. Stearns made his first artificial velum. In 1860 Dr. N. W. Kingsley came into the field, and took up Dr. Stearns' appliance. Finding it too complicated for the general practitioner to construct, and too expensive when completed for those in ordinary circumstances, he was led to serious thought in regard to modifying its production, but still adhered to the same principle of utilizing the levator muscle.

Dr. Kinsgley says respecting Dr. Stearns' appliance: "Two principles were vital to Dr. Stearns' instrument, namely, first, the artificial velum should embrace the levator muscles of the palate, so that it could be lifted by them; and, second, that it should bridge the upper pharynx behind the uvula, and cut off nasal communication at will."

Dr. Kingsley's modification of Stearns' instrument consisted chiefly in leaving off the triple form, and doing away with the central slit, the flap and the springs. The simplified form consisted of two leaves of soft vulcanized rubber, connected in the median line, the palatal portion running down to the uvula, and then bridging across at that point, and the nasal portion reaching across the pharynx. Instead of the appliance being made in sections so as to slide across each other, as in the Stearns, the bifurcated uvula slides between the two leaves, and the levator muscles of the palate lift it up to meet the pharynx, thus shutting off the nasal passage. It will be noticed that in this simplified form the Stearns principles are fully carried out, and to Dr. Kingsley that credit is due. His claims to originality are in the simplifying of the Stearns instrument.

Dr. Kingsley says: "An important principle enunciated by Dr. Stearns as essential to the success of all artificial vela for congenital cleft was that the instrument filling the fissure in the natural palate must be of the nature of a valve under the control of the muscles surrounding it, and so arranged that it could be elevated by them, thus shutting off the nasal passage, as is absolutely essential in the production of certain sounds belonging to articulate language. This principle was carried out by him first in the character of the material chosen, being of a yielding, elastic nature, and second in the form, being made to embrace the levator muscles, and subject to their control."

Dr. Kingsley in speaking of Dr. Suersen's appliance, says: "First, that of all obturators this is the best form for a congenital fissure, but while the wearer is enabled to articulate with such an instrument it is only after he has learned articulation with another apparatus. Second, that a soft, elastic, artificial velum is much better adapted to the acquirement of articulation than any unyielding, non-elastic substance, but when acquired an obturator may be substituted. Third, that in very rare cases articulation may be acquired with an obturator only, but it is the result of the extra activity of the pharyngeal muscles, while with the elastic velum the levators of the palate contribute largely."

A great many practitioners in treating a fissured palate simply separate the nasal and buccal cavities by a thin plate, thinking that the separation is all that is required. Some even make a great parade of this device, claiming it to be an improvement over any other appliance. A little reflection will show this to be impossible, as I shall endeavor to explain before closing this paper.

My own experience with soft vulcanized rubber for an artificial velum is that if it would resist the fluids of the mouth, and not go through a process of decay, and change its form, in short, if it could be made permanent, it would be all that could be desired. Since this is impossible, I do not hesitate to say that it is a very objectionable material, and I have been led to long and careful meditation regarding it.

I experimented for five years to provide an artificial appliance with hard rubber, carrying out the Stearns principle, whereby I could utilize the levator muscles to control the movement of the appliance, and with which articulation could be learned as well as with the soft rubber. My studies and experience induced me to settle upon the following device, which consists of a gold or hard rubber plate (A. Fig. 1), covering the roof of the mouth down to the junction of the hard and soft palates. From this point the artificial velum, F, extends back and downward, restoring the symmetry of the palatal surface by bridging across and lying upon the muscles of each side. The distal surface, G, or that portion coming in contact with the pharyngeal wall, is quite broad, and so constructed as to articulate perfectly with this surface, while the constrictor muscle contracts and closes around it on a semicircle. This is the Suersen principle, and the main idea I take from that appliance.

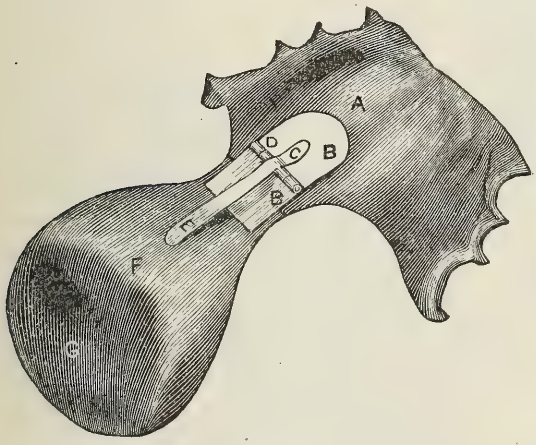

Fig. 1.*

The velum is of polished hard rubber, gold or platinum, and much resembles a chestnut in form.

It is attached to the plate with a hinge joint, B, B, thus giving free movement at the junction of the hard and soft palate. At the junction of the hard and soft palates there is a stop, which prevents any downward pressure upon the muscles when in a relaxed condition.

The bulb-like form of the velum (see D, Fig. 4) necessitated a thickness which would naturally have made it quite heavy, and as the resultant weight would be a serious objection, I was desirous of over-coming the difficulty. A suggestion happily came to my relief in this way: While in a drug store I accidentally took up a hard rubber truss made by a Philadelphia firm. Discovering that the pad was hollow, I thereupon wrote to the manufacturers, asking them if they would inform me how they prepared the rubber in that way. In their reply I found that the method was quite simple. It is as follows: Take the vulcanite rubber in the soft state and cut the sheets so that when joined together the desired form is given. Then a little water is dropped into the cavity (I found it better to add a little alcohol), the edges are sealed, and the piece vulcanized in the usual way. The steam produced by the water and alcohol inside creates sufficient pressure to keep the walls distended. By this method the appliance that the cuts were taken from which illustrate this article was made so light that it would not sink when put in water.

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*The accompanying cuts are kindly loaned by Dr. J. W. White, the editor of the Dental Cosmos.

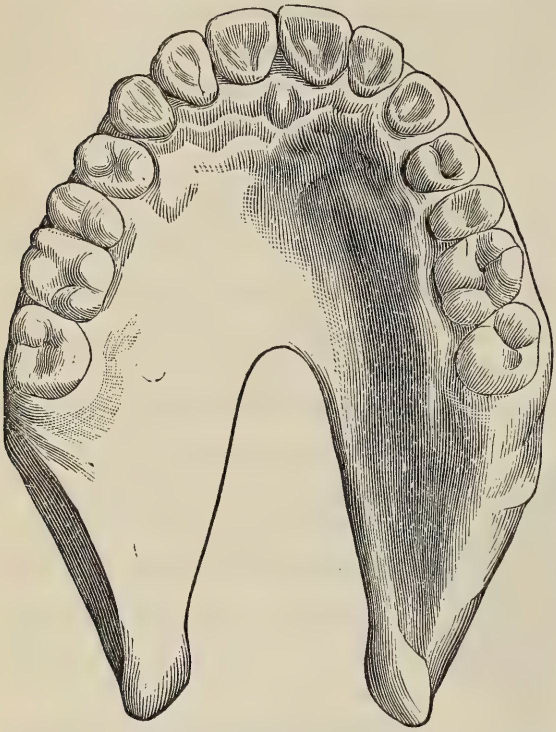

Fig. 2. The cleft, extending a little beyond the soft into the hard palate.

In treating a case by Kingsley's method I was obliged to use a hinge joint to bridge over a union by staphyloraphy. I found in that case that the appliance was much better controlled by the surrounding muscles, and saw a much more rapid progress in acquiring articulate speech. This led me to more fully provide for that muscular movement, and I will endeavor to give the reasons why this should be done. As we have before quoted from Suersen, in order to pronounce all letters distinctly it is necessary to separate the cavity of the mouth from that of the nose by muscular action, and to close the nasal passage in pronouncing every letter, except *m* and *n*. This can be demonstrated by holding the nose while endeavoring to pronounce all the letters as plainly as possible.

In studying the mechanism of speech we learn that more than three-fourths of the sounds of articulate language depend upon the integrity of the soft palate for their perfect enunciation. This being the fact, articulation with a rigid obturator must be extremely difficult to acquire. If three-fourths of the sounds depend upon the free movement of the natural palate, it seems to me a sufficient reason why we should provide for that movement in an artificial one.

Dr. Kingsley says that with a yielding appliance the levators of the palate contribute largely to correct speech. The surrounding muscles have control over my appliance in the following way: The artificial velum bridges across the opening and lies upon the muscles of either side. (See Fig. 3, D, D.) With all sounds requiring the closure of the nasal passage it is thrown up (D, Fig. 4) by the levator muscles, there being no resistance. The thickness of the velum brings its posterior surface in close apposition with the superior constrictor muscle, F, and thereby affords, in the pronunciation of the gutturals, a firmer resistance to the pressure of the tongue, G, than can be obtained with a thin obturator. By the presence of the hinge, B, the above movements are rendered so free and easy that there is no tendency to any displacement of the plate, such as occurs with a rigid appliance. If a nasal sound immediately follows a guttural, the descent of the velum is rendered certain by its own weight. (Fig. 5, D.) My first instruments show a spring bridging over the hinge, by which I intended to accelerate the movements of the velum. This I found later to be unnecessary.

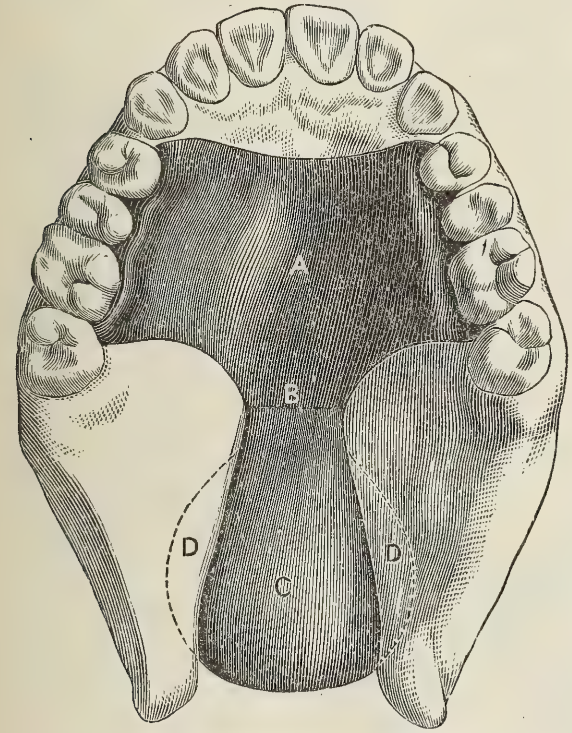

Fig. 3. Appliance in position: A, the plate; B, the stop, preventing any downward pressure when the muscles are in a relaxed condition; C, the artificial velum; D, D, muscle lying under it, the dotted lines showing the appliance resting on the muscles.

To accomplish the above with a material that would be permanent was a problem very difficult of solution. Of course it is impossible to give to a piece of mechanism muscular power, but it should be made so easily movable as to be acted upon by, and be under perfect control of, the muscles surrounding it.

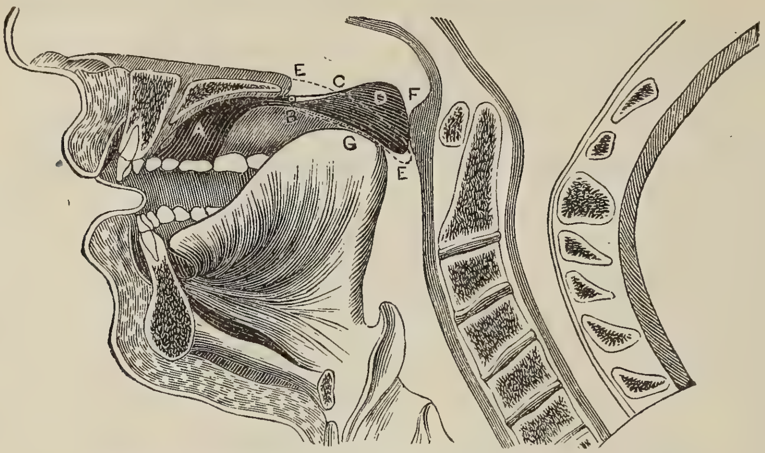

FIG. 4. The artificial palate thrown up by the muscles, E, E, as in all sounds requiring the closure of the nasal passage; F, the superior constrictor muscle, advanced to meet it; G, the tongue, raised, pressing hard against the appliance, as in pronouncing the letter k or g; A, the plate; B, the hinge joint and stop.

I claim the following advantages for my appliance:

First. That it is made of a permanent material.

Second. That articulation can be learned with it more readily than with any other appliance.

Third. That it is much easier to make.

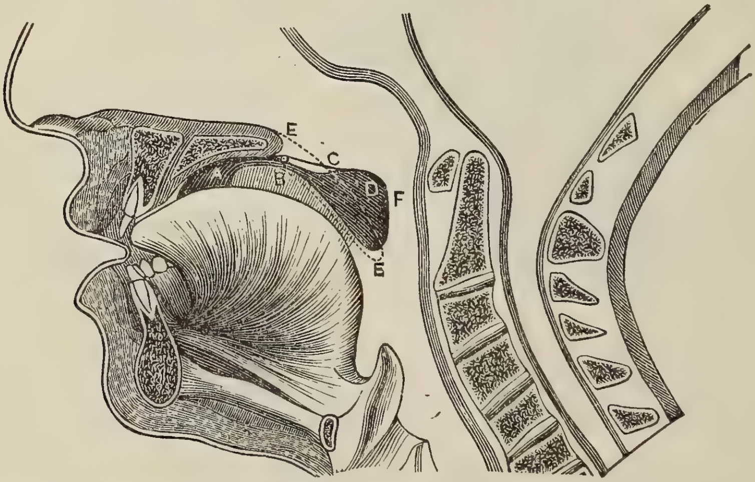

FIG. 5. The muscles relaxed, the appliance descended, thus giving a free passage for nasal sounds and respiration.

Thus the unsatisfactory operation of the surgeon has been replaced by artificial organs of precision, working upon physiological principles. The ingenious appliances of our distinguished colleagues, Suersen, Stearns, and Kingsley, whose scientific attainments and researches have reflected such luster upon the art of dental prosthesis, have excited my admiration as I have studied their complex operations; and if I have been enabled to extend their usefulness, and increase their value by substituting an imperishable material for the less excellent substances now in general use, I shall consider that the years of study I have given to this remote and rarely considered problem of science have not been altogether without their reward.

PERMANGANATE OF POTASH.

BY CHAS. MAYR, A. M.

[Read before the Conn. Valley Dental Society, at Savin Rock, June 19, 1884.]

The subject hardly seems sufficient to read a paper about; but as the substance appears to me to be a typical representative of a principle, I thought it best to make a few experiments about it, and to see what it did and how it came up to what is claimed for it. You all are familiar with the differences between fermentation, putrefaction, disinfectants, antiseptics and deodorizers; but, to be understood more clearly, I shall take the liberty to tell you what I mean by these terms. Every one has a special definition of his own.

I consider as a *disinfectant* a substance which by purely chemical reactions destroys an offensive substance.

An *antiseptic* is a substance which prevents the formation of sepsis and, as a consequence, of septic organisms and products.

A *deodorizer* is a substance which destroys the unpleasant odors alone. Let us see what such a deodorizer practically amounts to. To understand its action we must know what an odor is; perhaps not every one among you has realized that an odor is nothing in itself, and that an odor is nothing but the impression which the vapors of a certain substance produce upon the extremities of our olfactory nerves. The odors of a substance cannot be separated from the substance. When we smell a violet we do not smell the violet at all, but the vapors of a small amount of essential oil secreted by the glands of the violet. When we smell sulphuretted hydrogen we cannot separate the odor of the sulphuretted hydrogen from the sulphuretted hydrogen any more than we can separate the looks of a person from the person. The odor is simply one kind of impression which external objects make upon our senses. No substance has any odor which is not volatile, that is, which cannot be transformed into vapor.

Sulphuric acid, a very powerful agent, has no odor at ordinary temperature; but if you heat it you will begin to perceive a faint odor at about 180°, which becomes more and more powerful as the vapor becomes dense.

This also explains why we cannot smell through glass. Kakodyl, probably the most offensive substance produced, is perfectly odorless when sealed up in a glass tube.

The deodorizer, as such, is therefore a chemical which must destroy the vapors of the substance. In most cases such a thing is not possible without destroying the substance of the thing itself. In other cases, we may cover the odor of a substance by that of another, less unpleasant to our senses, similar as we cover tastes. The organ of taste is very different. Gaseous substances seem to have no effect upon it, but only substances soluble in water.

We have, therefore, so to speak, three senses corresponding to the three states in which matter may appear: The sense of feeling for solids mostly, or mechanical action; the sense of taste for liquids and solubles, and the sense of smell for volatile substances.

Most deodorizers are powerful smelling substances, like musk, essential oils, etc.; but they cannot properly be called deodorizers; because the odors exist and remain, we only cover one kind by another odor.

A disinfectant must act chemically. If we take a solution of sulphuretted hydrogen, to most people the solution smells offensive; but chemists get so used to it that, sincerely spoken, it does n't make to me any difference to smell sulphuretted hydrogen or roses. The unpleasantness is only at the beginning. If we destroy the sulphuretted hydrogen or other volatile smelling substances—be they now generated by putrid eggs or putrid meat, or other decaying substances—we disinfect the substances; anything which will destroy these substances is a disinfectant.

As a very handy and effective means to destroy not only the sulphuretted hydrogen but the ammonia, the ammonium sulphide, the fatty ammoniates, the amines like trimethylamine, dentists have used *permanganate of potash.* If we take any ore of manganese, like pyrolusite, and heat it with chlorate of potash and caustic potash, we obtain a green mass. This green mass is manganate of potash, K_2MnO_4—the oxygen in this case being derived from chlorate of potash, $KClO_3$, somewhat after this reaction:

$$KClO_3+MnO_2+(KaOH)_2=KCl+K_2MnO_4+H_2O+2O$$

If we boil this manganate of potash, the green color will turn violet, and a brown precipitate will become noticeable. The solution contains now pure permanganate of potash. The precipitate is a hydrated oxide of manganese. If we allow it to settle and pour off the red solution and evaporate it, we obtain the well known dark red crystals of permanganate of potash. This substance may be considered as a convenient means of carrying red-hot oxygen to any available point. One atom of oxygen in this permanganate of potash seems to be combined in an ozone-like manner, and a solution of permanganate of potash has indeed a faint odor of ozone. This odor becomes strongly perceptible if we add sulphuric acid to the permanganate. Ozone is, for practical purposes, nothing but red-hot oxygen and, as such, it will combine with all the available carbon, and hydrogen, and carbon-compounds, forming water and carbonic acid After this oxygen has combined, a perfect inert brown residue is left —a hydrated oxide of manganese.

As some writers use the terms antiseptics and disinfectants indiscriminately, I thought that perhaps this manganese of potash might best illustrate the difference. A substance which may be called a real antiseptic must not lose its power the moment it acts as a disinfectant, and if, after the substance has acted, a new production of offensive vapors takes place, the substance cannot be called an antiseptic. With this view in mind, I determined to settle the difference. I prepared solutions of different kinds; beer, bread and saliva; beer, meat and saliva; beer, yeast and saliva, etc. I waited till they had all got into that agreeable stage where sulphuretted hydrogen appears like perfumery compared with them, and then I applied different substances. I do not think that it is material to mention exact figure-statistics. I have them on my record book and, if needed, can bring them up; but I will only state the facts. One of the putrid solutions which reacted very sour, because of the prevalence of fermentation over putrefaction, I treated with a five per cent. solution of permanganate of potash; every odor disappeared; a heavy brown precipitate appeared and the liquid on the top of it, slightly yellowish, showed a most astonishing transparency. Every small organism had disappeared. The oxygen had burnt up everything. I allowed this pure disinfected substance to stand a week longer, and, as I had supposed, no antiseptic effect of the permanganate showed itself; after one week, not only did the fluid swarm anew with new organisms produced from new infection, but even the heavy precipitate of oxide of manganese was all dissolved, and the "germs" were all powerful. Another of these septic solutions I treated with equal volumes of a concentrated solution of white arsenic;—not the slightest effect was perceptible. Another one, with equal volumes of a solution containing two per cent. of acetate of lead. The offensive odor disappeared, only a slight sour odor remained; but no new infection took place, although the solution was exposed in the same manner as the other. A fourth solution I treated with equal volumes of a one per cent. of bichloride of mercury solution; there remained a strong odor, a heavy precipitate of calomel was formed; but, to my astonishment, after about two weeks, a small scum had formed on the surface of the solution and, examined under high power (1,800 diameters, Tolles' immersion lens), small rows of a form resembling that of the ferment of lactic acid, yet very much smaller than usually seen, were perceptible. This fact stands somewhat isolated, and I was surprised because the solution contained mercury not only in the shape of calomel, which is not absolutely insoluble, but also in some dissolved form. From these experiments it may be seen clearly that none of the substances was as perfect a disinfectant as permanganate of potash, but almost every one of them was a better antiseptic than the substance.

Some little detail of interest might be described about these experiments, but dentists, as a class, have to deal with those complex fluids surrounding the teeth, and to be of practical use for them, experiments have to be made with liquids similar to these. In connection with these experiments I would like to say something about sublimate. I am astonished at the recklessness with which, to my conception, sublimate of mercury is used by some practitioners. If this sublimate of mercury has a debilitating effect upon lower organisms, it certainly has also the same upon the big, lower organism—man; and a continuous treatment to even a 1:1,000 solution of sublimate will prove very active in producing a debilitated race.

It is true, in syphilis it might be extremely useful, but we do not want to treat every person for syphilis. For occasional application I do not doubt that mercury is quite effective; but a chronic treatment with it appears to me as if smacking a trifle of old Molière's doctors.

Have any of the gentlemen tried lead preparation for the treatment of lesions about the teeth? They are certainly very effective and much more kindly borne by the tissues than the mercury solutions.

They seem to me to deserve more attention. The acetate of lead and the basic acetate of lead would both be good preparations for dental purposes.

I do not care to give long arrays of figures, or lengthy deductions. I find that the discussion is usually far more profitable than a lengthy paper.

THE SEPTIC THEORY OF DENTAL CARIES.

BY F. SEARLE, D. D. S. SPRINGFIELD, MASS.

[Continued from page 243.]

It is not quite evident why Underwood and Milles gave the name, "septic theory," to their explanation of caries—a disease dependent upon the presence of organisms—rather than the more appropriate term, "germ theory," originally given by Pasteur, to explain the same class of diseases. Having proved that the organisms were derived from germs, Pasteur gave the name, "germ theory," to distinguish it from other theories of septic diseases then in vogue. If the septic theory, as applied to dental caries, has any significance, it is identical with that of "germ theory," which certainly is more appropriate. Besides, there are already in medical use a sufficient number of different terms, meaning one and the same thing. It is desirable, therefore, for the sake of the illustrious man who gave the name, as well as for appropriateness and uniformity, to retain the use of the term, "germ theory."

In looking for data upon which to show the effects produced by bacteria in or upon the tissues in which they are found, we cannot do otherwise than to refer to papers and text-books which are regarded as authority in this department of knowledge. I shall not introduce the question of the different genera and species of bacteria, as this would open too large a field, and would not be pertinent to my purpose. We have to deal now only with the micro-organisms, called pathogenous bacteria.

Zeigler, in his text-book on Pathological Anatomy, says: "It has long been known that certain diseases arise in consequence of the settlement of certain plants and animals in the human organism. Only of late years have we learned that the domain of these parasitic disorders are of wide and far-reaching extent." "Some of these parasites or bacteria find their appropriate soil in the perfectly healthy tissues, in which they grow and multiply; others can only develop in tissues morbidly changed so as to correspond to their requirements. All that is necessary is that a bacterium should reach a spot that affords the conditions for its development. In this it multiplies and forms colonies, which live at the expense of the tissue invaded. Sooner or later these local settlements bring about degeneration and necrosis of the affected tissue depending upon the nature of the bacteria and of the tissue."

"In the first place, the bacteria, as they grow and multiply, withdraw from the nutrient fluid of the tissues the elements they require for building up their own cells. These elements are chiefly nitrogen, carbon, hydrogen and oxygen, and also the inorganic components of sulphur, phosphorous, magnesium and potassium." "In the next place, they set up marked chemical changes in the nutrient fluid. It is bacteria which superinduce putrid decomposition in albuminoid bodies; they transform sugar into lactic acid; lactic acid into butyric acid; and alcohol into acetic acid. When albuminoids undergo putrid decomposition we have formed peptones and similar bodies: a certain principle or poison; and bodies resembling ferments."

"Pasteur, Lister and others speak of the decomposition as the direct result of the growth of bacteria. Decomposition and fungus are inseparable; the one ceases when the other is removed. Processes of this nature, set up by bacteria, are best distinguished as fermentation. Considered with respect to their property of setting up fermentation, bacteria are often described as organized ferments. Bacteria have also the power of setting free certain substances which have a decomposing action like themselves, and are known as unorganized ferments."

"Pasteur regards fermentation as immediately dependent on the activity of the organisms. Fermentation begins only when the supply of free oxygen to the bacteria is restricted. They then begin to abstract oxygen from the compounds contained in the tissues or nutrient fluid, and so disturb their equilibrium."

"Fermentation and putrefaction can only take place in presence of the corresponding fungi, and the amount of decomposition produced depends on the quantity of the fungi present. It does not, however, follow that each kind of decomposition is due to a single specific fungus, nor that one fungus may not give rise to more than one kind of decomposition. In most putrefying substances we find bacteria of several species."

"In general terms, we may say that local settlements of bacteria will sooner or later bring about degeneration and necrosis of the affected tissue. When this may occur, and how widely it may spread, are circumstances depending on the nature of the bacteria and of the tissue."

"Each kind of bacteria has a corresponding special group of tissues in which its mischievous effects are invariably and especially apparent. If they reach the blood, through the lymphatics, or directly, they are carried by it to remote parts. Many of them perish in the blood, others again increase and multiply. Once in the body, they multiply in the blood or in some tissue spread through the system, and call forth the special changes characterizing the several diseases." He might have added: Once in the teeth, the bacteria advance from enamel to dentine, from dentine to pulp, from pulp to perios, and to the soft tissues of the bone, sometimes causing extensive necrosis and, in rare instances, pyæmia.

In this connection, i. e., to show the agency of bacteria in producing disease, I will add only the following from Tyndall. Speaking of the relation of living organisms, he says: "Living ferments, finding lodgment in the body, increase there and multiply directly ruining the tissue on which they subsist." Again, he says: "For in that common ferment there seems now to be identified a force which, acting on organic matter, whether dead or living, can on the one hand initiate putrefaction in what is dead, and on the other hand initiate inflammatory processes in what is living."

Enough has been quoted from the writings of the world's best scientists to show the action of pathogenic bacteria on soft tissues. The question next to be determined is, do soft tissues exist in the teeth?

The knowledge of the minute anatomy and physiology of the teeth has been a matter of slow development, dependent upon the improvements of the microscope and the methods of preparing specimens; also of the training of the eye to make correct observations. Up to the time of the opening of Prof. Heitzmann's school in New York, and the more thorough study of the histology of the teeth by Dr. Bödecker and many others, the teachings prevailed that "the dentine is a homogeneous calcarious matrix in which no trace of cellular or other structure can be detected, permeated by minute tubes radiating from the pulp-cavity, which are occupied by fibrils proceeding from the pulp and endowing the tissue with sensibility. The tubes being so minute that their actual structure cannot be determined, but they undoubtedly are the sole protoplasmic constituents of dentine. The organic basis is contained in the inner walls of the tubes surrounding the fibrils. No cellular or protoplasmic elements are discoverable in this fibrous structure; the vessels of the pulp are not in intimate contact with dentine; the dentine and enamel are incapable of anything like pathological action," etc.

Dr. Miller says, in a paper just published in the *Dental Record*, that in the teeth the lime-salts form a definite chemical combination much more insoluble than the lime-salts themselves; that this combination is the result of the vital force in the tooth itself. Dr. Miller gives no authority for this statement. These teachings are directly at variance with the observations made by Prof. Heitzmann, Dr. Bödecker, Dr. Abbott, and many others in the New York School of Microscopy. The teachings of that school are embodied in a work by Prof. Heitzmann, "Microscopic Morphology," published in 1883. Neither Underwood and Milles nor Dr. Miller seem to have been acquainted with the discoveries made in the New York school. Their papers recognize only the former views of dental anatomy, consequently they entirely ignore the possibility of any vital reaction or inflammation on the part of the bioplasson, excepting that Dr. Miller does admit that the same vital force which produced the chemical combination of the lime-salts with the organic matter can and, as it seems, does under certain conditions of ill-health dissolve it again; that is, while no irritation of ferments, or of the taking away of lime-salts, can affect the living matter, ill-health can make the vital force reduce the chemical combination of lime-salts with organic matter to a simple mixture more easily soluble for acids. All this belongs to a former period.

I have tried to avoid any allusion to the earnest endeavors of Dr. Miller to explain the phenomena of caries on the theory that the organisms only run an acid factory and the acids destroy the teeth. But the immense importance which has been conceded to his work and, as it seems to me, the overestimation of its scientific value, so impresses me that I must notice a few of its inconsistencies. I will gladly concede all merited honor to an American scientist, and regret that I cannot agree with the *Independent Practitioner* in placing Dr. Miller at the head of the list of recent scientific discoverers. In studying Dr. Miller's papers I claim only the right of a juror to pass judgment upon expert testimony. The question in dispute between Underwood and Milles and Dr. Miller refers only to the methods by which bacteria produce caries—the former claiming as a matter of *opinion merely* that they do so by an acid which they create by feeding upon the living fibrils—the latter claiming to have *proved* that they produce the acid by feeding on food substance found in and upon the teeth.

Dr. Miller lays down this rule for the observance of invesigators, viz: "It is not enough to guess the cause, or guess at it; we must *find* the *cause* and, having found it, *prove* that it is the one sought for." I will notice some of his assertions.

He says: "There are at least a score of acids possessing the power of extracting the lime-salts from the tooth in a high degree to be met with in the oral cavity under varying conditions. Consequently until some one by facts establishes a better theory we must look upon the theory of decalcification by acids as the accepted theory." This is proof number one.

Again: "There is no difficulty in accounting for the source of the acids concerned in the caries of the teeth. The saliva is impregnated with acids, ... but by far the greater part in the decalcification is to be attributed to those acids which are produced in the mouth by fermentation."

Experiment: "Pieces of sound dentine placed in a mixture of saliva, bread, meat and sugar, became in ten days decalcified to the depth of half a millimeter. Numerous experiments of this nature showed a constant and powerful generation of acids. The conditions present in the experiment may always be found in the human mouth. (Not proved.) Portions of food remain lodged between the teeth, or in fissures and depressions in the teeth themselves, or in the cavities of decay, and lead to the production of acids sufficiently strong to at once attack the teeth." What an assertion is the following: "These conditions may always be found in the mouth." No constant change by the alkaline secretions, by masticating and drinking. No constant flow of saliva, but the mouth a closed vessel, like a corked bottle in the laboratory for ten days. What a wonder the teeth do not all disappear the first month after their eruption. Nature certainly made a great mistake in making such teeth for such a mouth. Such is proof number two.

Again: "Have bacteria the power either to penetrate or decalcify sound dentine?" Answer: "In not a single instance have I found them to pass beyond the softened dentine into the sound dentine." Therefore they cannot penetrate the sound dentine. Underwood and Milles say they have so found them, but their investigations are of no account. They are only novices—have been only *seven years* investigating, while I have been nearly *three years*, besides doing a large dental practice. Besides, the dental canaliculi are only $\frac{1}{4500}$ of an inch in diameter, while an average bacterium is $\frac{1}{25000}$ of an inch, and some are even less than half this size. The largest are $\frac{1}{10000}$ in diameter; therefore, being from one-half to one-tenth the size of the canaliculi, they have not the power either to enter or decalcify sound dentine. And, again, the canaliculi being filled with protoplasm and living matter, the bacteria would have nothing to live upon themselves or to give their rapidly increasing family.

Again: "We may look upon caries of the teeth as consisting of three stages (1) decalcification," so that the bacteria can enter the tubuli, being one-fifth its diameter; (2) "infection and devitalization of the decalcified dentine," for of course they could not infect and devitalize the living matter until the lime-salts are removed so that they can gain entrance. "By decalcification I mean only the breaking up of the bond of union," and leaving a mixed up ruin. The bacteria could find their way so much easier into a trackless mass than through a well-organized structure, with open passways and nothing to hinder, but plenty of food. And, again: "I have adhered to the (old) acid theory of decalcification in this article, not because I regard it in any way competent to account for all the facts, but because it comes nearer to accounting for them than any theory yet proposed." *Quod erat demonstrandum.*

As a juror, I am not surprised that the judge decides the evidence to be incompetent and that there is no case before the court.

In Dr. Miller's final summing up of what he has done, I find the following:

"I proved at the same time that the invasion of the micro-organisms was not in the majority of cases simultaneous with the softening of dentine, but that large areas of softened dentine could be found that contained no fungi. Of all those who examined my preparations in America, no one, whatever his theory, ever denied this fact. I conclude from this that the softening of the dentine went in advance of the invasion of the organisms."

The passing around of specimens from city to city, to be examined by men of no special attainments as microscopists, under instruments good, bad and medium, and then concluding, because no one ever once denied his claim, "that the softening of the dentine went in advance of the invasion," is the weakest kind of negative evidence. I happened to be present with several others, two of them good microscopists, when some of those slides were under examination. The unanimous decision was that with the instrument in use, which was called a good one, no judgment could be formed.

It is unfortunate for Dr. Miller that he has to depend so largely upon negative testimony. He also takes too many things for granted: For instance, that he understands the true anatomy of the teeth; that he knows that there can be reaction of the vital structure; that the organisms can produce no other substance which can "destroy the equilibrium;" that the organisms cannot act as a "true ferment in abstracting oxygen from the tissue, when deprived of air," (Pasteur) etc., as testified to by the authors I have quoted. Also that he has produced the conditions found in the living mouth sufficiently similar to give reliable evidence to the results he has obtained. Having admitted the necessity of organisms and bread and butter for the production of acids, he ignores any further need of physiological processes of vital chemistry in breaking up the "bond of union." In other words, caries is a chemical injury, not a disease. He squarely presents this issue, the outcome of which will be watched with interest. The position is strongly suggestive of the story of the bull and the locomotive.

In the language of Zeigler, "When we can define a disease, not according to its symptoms or its morbid anatomy but strictly by referring it to its causes, we shall gain far more than a comprehension of the affection; we shall have done much to settle the therapeutic treatment."

Dr. Miller is to be congratulated that, acting in accordance with this statement, he has been seeking agents destructive to organisms, thus admitting the truth of the germ theory of dental caries.

I will close this brief notice of the papers of Dr. Miller with a fitting paragraph from Gradle:

"If we were to drop our acquired medical notions, and were to approach the study of disease from the standpoint of the modern naturalist, the germ theory would present itself in a more attractive light. Throughout nature every species of living beings struggles for its existence with all other beings with which it comes in immediate contact. In numerous instances this struggle amounts to the preying of a smaller species upon the body of larger creatures, the former deriving from the organism of their host their means of subsistence."

There is little to be said about the gross chemical theory of caries, so long accepted under protest. That the explanation it gives has been and is entirely unsatisfactory, is proved by the discussions which for many years have been going on, and the many attempts to find a better theory. Not until the investigations of Underwood and Milles were published was much progress made in solving the difficult problem. Dr. Miller has added hardly anything to their discoveries. Even if all he claims in regard to what organisms *do not do* shall eventually prove correct, it would still remain, as Underwood and Milles stated in 1881, that not only caries but suppuration of the pulp and alveolar abscess also depend upon *the successful working of organisms, and that the exclusion of germs* by the use of powerful antiseptics would prevent the *disease.*

Those who still seek an explanation in the gross acid theory, are referred to a series of articles in the *Journal of the British Dental Association,* by Henry Sewill, Mr. R. C. S. and L. D. S., Eng. Only those of May and June have come to hand. These are full of old beliefs and opinions, based on former views of histology, and a rich spicing of sneers and ridicule aimed at those who believe in the vital reaction of the living matter in dentine. Thus far they contain nothing special in the line of new evidenee.

In regard to the ability of the dentinal fibrils—or the bioplasson of Elsberg—to take on inflammatory action, it is sufficient to refer to the evidence seen in the effects of thermal changes following the introduction of a metallic filling, often continuing for months, and resulting in the death of the pulp; to the effects of drugs, such as chloride of zinc, alcohol, and other irritants, in producing their characteristic sensations; and especially in the effects of arsenic, when applied to *sensitive dentine*—a term long in use. The effect of this agent in causing inflammation and death of the pulp, when applied to the periphery of dentine, is well known. Dr. Bödecker, in the *Dental Cosmos,* Vol. 25, page 505, has shown the inflammatory condition of the fibrils after the application of arsenic. Why, then, should it be doubted that the irritation produced by parasites feeding upon the fibrils should also set up inflammatory action? That this point will eventually be conceded by those who now ridicule, excepting some like the author of a recent book written to prove that the earth is flat, is as certain as that they are capable of intellectual progress.

At my request, Prof. Mayr has kindly permitted me to present his views of dental caries, given more fully than have been published elsewhere. His many friends will be interested in their perusal.

"The development and progress of caries appear to me at present, considerably modified by suggestions from dental friends, studies and discussions, from their first somewhat foggy shape, to go on in the following order:

First. A congenital defect in the enamel, not only a pit, a fissure, but within this pit or fissure an abnormal, imperfect foundation of enamel and enamel fibrils.

Second. The remaining of a particle of food in this pit.

Third. The presence of all kinds of germs in the mouth and their consequent immediate invasion of this remaining particle of food.

Fourth. The lively fermentation of this particle of food, laying bare by the resulting acids a certain amount of live matter in the enamel.

Fifth. The final death, from lack of proper circulation, of this weak live matter, and thereby irreparable loss of territory.

Sixth. The continuing process in this manner of killing the abnormal weak live matter, its consumption by the germs, etc., in the enamel, very often only within a few weak canaliculi, until the dentine is reached.

Seventh. The spread of the germs in the interzonal spaces by the withdrawal of nutriment from the fibrils of the bioplasson in them, hence starvation and death of the fibrils. They are then appropriated by the germs, at the same time food from without and within undergoing fermentation, as a secondary and remote process acid formation is going on, which dissolves lime-salts; the dead but not yet fermented zone is the intermediate zone.

Eighth. Entrance into those dental canaliculi which do not contain strong filaments, absorption of their pabulum by the germs, thereby death of the filaments, which are afterwards consumed by the germs; by the advance of the process in the weaker fibrillæ, also the stronger ones become finally weakened and a prey to the enemy; afterwards secondary solution of the lime-salts, etc.

Ninth. The interruption of the proper circulation in the destroyed canaliculi, absorption of pabulum by the germs, and death of parts of dentinal fibrils, causes the remoter parts to react, hence inflammatory processes in the more remote regions, throwing up of walls of lime-salts to keep the enemy out, pain to cause the patient to seek aid, etc.

Tenth. If not checked, the inflammation in the pulp reaches a stage where it becomes choked in its own stagnant circulation, death of the pulp, advance of the germs within the pulp cavity, but no dissolving of the tooth without saccharine food, because these germs cannot live on meat alone, at least they do n't produce lime dissolving acids.

Eleventh. The tooth is not dead as long as cementum and pericementum are still alive; the enamel remains alive with exception of the invaded spot.

Twelfth. The carious, soft, decalcified old plug in a cavity teaches nothing whatever; it is the decayed corpse killed by a disease which has long ago run its course and which is active on the boundary between the healthy and the friable dentine; this plug is entirely a secondary product which has not as much connection with the process as the scab on a sore has with the sore."

In conclusion, I congratulate the dental profession on what has been done in this line of research during the last seven years. If I were to name the essential agencies more immediately connected with this good work, the names of Underwood and Milles and Prof. Heitzmann and his New York school, would stand foremost, never forgetting the great preparatory work of Pasteur and Lister.

TRANSLATIONS.

TO THE PRESIDENTS OF THE DENTAL COLLEGES IN THE UNITED STATES OF AMERICA.

Gentlemen: From the *Dental Cosmos*, 1884, on page 247, I see that a meeting of the representatives of all dental colleges is called for August 4, to New York, which has for its aim deliberations about uniform rules for graduating candidates.

The warm interest which I have always taken in dental colleges prompts me, gentlemen, to address these lines to you, and to call attention to abuses, the removal of which I request in a civil as well as urgent manner. The meeting previously mentioned seems particularly fitted to foster the object of my certainly not unfounded request and to procure the much-needed quick remedy.

I have before me an article of the *Independent Practitioner*, 1884, page 241, which comes from the pen of an American by birth, Mr. J. L. Tierney, D. D. S. In this article the same abuses were spoken of with the greatest objectiveness, which are the cause of my remarks. Complaint is made in it that the dental colleges graduate persons from foreign countries (especially Germans), who do not possess the least scientific preparation, and who, without even being master of the English language, have belonged to the college only four or five months. The consequence of this is, that people who are here in Germany in the most lowly positions, as "barbers, chiropodists, dental office cleaners," etc., after a short stay in the Union, return as "D. D. S."

These statements of your fellow-countryman I can only, unfortunately, corroborate. I take the liberty to mention, from the numerous familiar examples of the more recent time, only one: A barber of this city, last year, in September, who was formerly servant in a dental establishment, went to the United States of America and entered a dental college much frequented by Germans. From November until February he heard the lectures in the English language, and—graduated as D. D. S. The man can scarcely read English words, much less follow an English lecture! Such people practice in the German Empire, already in great number, as "American Doctors of Dental Surgery," graduated from legal colleges. At a German university these people would never be admitted as hearers, much less as students fit to take part at State examinations, because it is generally thought that no one can enter successfully a special study after such deficient preparation. How is it possible that these people, who scarcely master their mother tongue, at American dental colleges, after a four to five months' course of lectures, in the English language, are able to pass the examinations successfully for D. D. S? How is it possible that these foreigners, in such a short time, appropriate to themselves those acquirements and faculties which the American by birth can obtain only after two years' study? I must agree indeed with Mr. Tierney when he says, in the article mentioned, that these "five month doctors," although not in form, at least in quality, have to be considered as standing on the same level with those who have their diplomas from a Buchanan or Wisconsin college. It cannot be wondered at, gentlemen, that dentists, licensed in Germany, cannot consider those uneducated persons who graduate in your country as colleagues. But what opinion must the German public form of American dental colleges, when it sees those people who, five months before have been barbers, return as "Doctors of Dental Surgery?" It is to be regretted that, under these circumstances, the innocent must suffer with the guilty; and we have here in Europe, among "American dentists," many who are well qualified.

In the whole world, and not the least in my own country, the high merits which the United States of North America have acquired, in the development of dentistry, are always acknowledged. Your dental colleges were esteemed for a long time as the high school for dentists, and one could justly say that that dentist who, coming from a university in his own country, had attended an American college for his perfection, had done the most, possibly, he could do for his education. For that reason many Germans, who had already acquired an excellent home training, went formerly to the Union to perfect their acquirements at a dental college. To-day it is different. To-day it is for the greater part entirely uneducated people who, in the most favorable cases have been employed as dental servants, who are attracted to the American dental colleges—a few with the intention to learn, many more with that of acquiring the diplomas as D. D. S. in the shortest time possible. On this account, the former good name of your dental colleges has suffered severely, and will suffer still more in the future, if a remedy is not very soon procured.

The educated German dentists who would be ready to expand their knowledge at your dental colleges are deterred from going there; for you see, with what people they must associate in the college, and what incapable persons they must afterwards consider as "colleagues."

I believe, gentlemen and colleagues, to have sketched to you the outlines of a true picture of the circumstances which have already damaged the formerly good name of your dental colleges, and threaten to destroy it in future. The interest which I have always taken in the American dental colleges, and which I may suppose as well known to you, gentlemen, may excuse my requesting you to turn your attention to those abuses described by Mr. Tierney and by me, and to remove them as soon as possible. Take care, therefore, gentlemen, that in future only really capable persons are graduated from your dental colleges; that to all those foreigners who have not obtained a license in their own country, or at least have not attended a university a sufficient length of time, the title of a D. D. S. be given only after a course of several years, and after they have given an actual proof of their capacity by a thorough examination! Only by the severest application of these principles at the examination for graduation, can your dental colleges again obtain the former reputation with us in Germany.

With great respect,

DR. ADOLF PETERMANN.

Frankfurt-on-the-Main, May 21, 1884.

Reprint from the Monatsschrift fur Zahnheilkunde.—M. BARDWELL.

SUBSTITUTES FOR LOST JAWS.

BY DR. W. KAY, OF BERLIN.

[Translated from the Zahntechnische Reform, March, 1884.]

Continued from page 227 of the Journal for June, 1884.

The cavity in the substitute may be secured in a different manner than by inserting cotton wool. I have found it mentioned that the interior may be filled with small pieces of zinc, which can be eaten away by muriatic acid. I think, however, there would be danger that these pieces of zinc might penetrate through the caoutchouc walls and as an equal thickness of the latter cannot be obtained and the rubber would thus mix with the zinc pieces, the mass would be unnecessarily heavy. A very commendable method is to use sand. We form first, of cotton wool, a suitable pad, according to the shape of the cavity, and sew it in a linen bag, but so that a little space is left open to allow for the removal of the cotton wool. After removing the wool we fill the sack with very fine dry sand, and the aperture is sewed up. We now proceed in general as we should had the cotton wool been used instead of sand. After vulcanizing, before finishing, we bore a small hole in the piece and beat it with an instrument until all the sand has run out. We then cut a small joint in the hole, file a suitable cylinder out of vulcanite, heat it a little and turn it into the hole; it will then fit into the joint and be perfectly secure. We now cut the remaining end away and finish neatly. Should the upper jaw have no natural teeth, we must of course provide for the retention of the substitute by springs. I had such a case which was, however, favorable, inasmuch as on the lower jaw there were only four incisors. If all the teeth of the lower jaw are present, so as to embarrass the application of springs, then we must place a bow bridge along their inner side, which must be suitably attached to a piece on the outer side where the springs can be fastened. In rare cases, when the teeth are poor, we will have to decide to make room for the under portion by extracting. In cases where the remaining portion of the upper jaw has become toothless, it is much easier to get an impression, for the impediment caused by existing teeth is removed, and we can more easily carry up the impression cup. We next make pattern plates, from the models for the bite. In the case of the lower jaw, we fill up the spaces where teeth are wanting with wax (which must well harden) to the height of the teeth. The pattern for the upper piece is made of gutta-percha, strengthened by inserting wire, and the alveolar rim is made of wax as high as we think it should be carried. We cannot insert these patterns for taking the bite with springs, as the contraction of the mouth causes difficulties, and the patterns might be easily brought out of shape. We therefore hold the proof-plate for the upper jaw, with an instrument or the fingers, in its place, so that it fits tightly, and then take the bite. It is necessary to mark correctly on the wax the length which the teeth are to have. As a rule, they must be very short, as the mouth at first can be but slightly opened, and yet there must be room enough to allow the passing of a tea-spoon between the teeth while eating. We therefore remove wax from the alveolar rim till the right proportion has been attained, and of this we can judge best by causing the mouth to be opened as far as possible, and taking into consideration the space between both wax surfaces. It is possible that by thus practically proceeding, æsthetic laws are duly regarded, but the former are here of greater importance. The plates are now put into the articulator, packed, and fitted without springs by holding the upper portion again with the fingers in its place, and letting both bite together. If the bite is satisfactory, the pieces are again put into the articulator, and the springs adjusted. On the non-resected side, this is accomplished without difficulty; the resected side, however, requires great care. First, the buccal protector on this side is modelled out of wax. The spring clasp must also work very accurately on this side; it must not act against the teeth or the buccal protector; it must also be enclosed by the buccal protector. The clasp supporters mnst be vulcanized and not screwed in. After the clasps are regulated, I take from the supporters and plaster the piece, but take the precaution to brush over with thin liquified plaster the head of that supporter which lies under the buccal protector, so that this fills out the space between part and joint, otherwise rubber might be pressed between and be difficult of removal on account of the impeding buccal protector. The plastering and packing the forming of the mass, etc., is done in the manner already described, only the opening of the flask is more simple, as the model has no teeth and there are no clasps.

P. S. The first part of the foregoing article has been reproduced in several foreign journals. *L'Odontologie* remarks, in its February number, in addition to the translation, as follows: "Coles and Kingsley have gone still further in the perfection of impression-taking; it is often necessary to apply moulds in these difficult cases, and sometimes we cannot obtain an exact or even satisfactory impression without them. A primary impression serves for the making of an impression cup for the special case out of rubber, lead or gutta-percha. Coles has made one consisting of two halves; first the impression is taken on one half and then in the other. Either this method, or any other where manipulating in halves can, as the case requires, be applied, but it is evident that our German colleague cannot obtain models of sufficient exactness with the rather simple methods he recommends."

This criticism of our Parisian colleague was written before they had read the continuation of my article in the February number. The enumerated methods of the moulded impression cup for special cases are just as well known to me as Coles' perforated claw-like cup for defects of palate. I am, however, of the opinion that those simple methods which I recommend will yield more satisfactory results if, as I have stated, irregularities of the impression are corrected in the proof-plate. I am further of the opinion that even with the special impression cup, an exact impression cannot be obtained; it will, as regards the resected side, only be approximately correct, on account of the difficulties I have already cited, and it will always be the duty of the artist to construct the substitute on this side partly according to his judgment, and to let it be worn to see if it answers its purpose in every direction. I also think that the special cup, made after the whole surface of the first impression, by halves, would cause more difficulty in its insertion than the simple modified cup I recommend. We cannot, even with the special cup, obtain the entire height of the defect, but this is not necessary. I have obtained entirely satisfactory results with my simple methods; for the four cases I made are all worn with comfort, and the simplicity of a method is certainly no fault.

DISINFECTION BY HEAT.

BY DR. H. BUCHNER.

[Translated from the Ærztliches Intelligenzblatt.]

Concluded from page 179.

In this report, the scientific basis has been acquired partly through experiments made by the Imperial Board of Health, and partly through experiments of my own, which conjointly prove that great heat (above 140° c.) is necessary in dry heating for disinfection, but that with the aid of water vapor, of the temperature of 100° c., working for some hours, it is quite sufficient to kill the spores of spleen gangrene, which may be considered the most resisting pathogenic micro-organisms. These experiments were made in Berlin, in 1873, at the city barracks, where a suitable apparatus was put up and made use of. A second considerably improved apparatus was constructed there in 1879, and used. An accurate model of the latter was found in the Exposition, the construction of which is as follows: In a room supplied with a double wall, and isolated, between which strong copper vapor pipes are placed spirally in the inner wall and floor, into which vapor is conducted from outside; a second narrower pipe lying on the floor, with holes made in its lower part, serves for direct absorption of vapor. The ceiling of this chamber is pierced by a drain-chimney covered with a helmet adjusted so that the chimney can be opened or closed. A few short pieces of pipe, not much above the floor of the chamber serve, when opened, to introduce fresh air. In the outer wall of the chamber there is an opening supplied with a double iron door, which serves as a means of entrance for the objects which are put into lateral benches. The interior serviceable space contains 11.8 cbm. For disinfection, we first heat the large copper spirals with vapor till the temperature in the chamber has risen to about 110° c.; then follows the letting in of vapor through the smaller pipes, during which time the copper spiral is still being heated. Now, the letting in of the vapor is interrupted while the large spiral still heats on, and the chimney helmet is opened to let in ventilation. The art of applying dry and moist heating is due to H. Merke, director of the barracks. The great advantage hereby gained is that the vapors do not touch cold objects, and thus avoid settling on them and totally wetting them. The objects being already hot, when the vapor enters, the condensing of water vapor is very slight and the vapor can therefore act upon large objects much more easily, such as a mattrass or blanket. At the same time, another advantage is obtained, viz: that of preventing the clothes being injured. With simple application of vapors yellow stains ensue. By the ventilation alluded to, with the continuous heating, we find that the articles in the chamber are perfectly dried, so that when the chamber is opened they are taken out dry. With this apparatus, the principal thing was the control of temperature in the large objects disinfected. Even should the temperature in the chamber reach a certain high grade, such as 110° c., it is not likely that the interior of a parcel of blankets would have an equal temperature. Generally, the temperature of these objects is (if the heating does not last too long) less than that of the chamber. As a guide in these matters, Merke has made several experiments with maximum thermometers, which show that the imparting of temperature, even with very large articles, is quite sufficient to give through the ordinary process a heat of 100° c., and which, with the aid of vapor, is enough to kill all pathogenic fungi. On the same principle, and after Merke's direction, a transportable disinfecting apparatus has been constructed, and one was at the Exposition. It deserves special interest, for we can, when in danger of epidemics, have recourse to this apparatus in all cases where chemical disinfection is impossible.

EDITORIAL.

CRITICISMS.

The *Cosmos* of June, 1884, contained a report of a meeting of the New York Odontological Society, and in this report a paper by Prof. Charles Mayr is given. His definition of disinfectants and antiseptics rests upon *his* conception of what putrefaction means, and to accept one term one has to accept the other. He makes a praiseworthy effort to give to words a clear and precise meaning, and in his zeal he may also make mistakes; but the principle is good.

The theory that oil of turpentine acts by its oxygen-carrying power, as pronounced by Prof. Mayr, would seem to need some support. Why does he ascribe to this substance such a peculiar action? Is it because of the fact, discovered long ago, that turpentine absorbs oxygen with great speed and converts a considerable amount of it into ozone, which has been found very destructive to germs? Perhaps this is the way he wishes us to have the oxygen-carrying power of turpentine understood.

We recognize in his arsenic theory a favorite idea of the professor, but a better one than many others we have seen.

On page 346 the professor says: "Pour mercury into water and it remains odorless." What did he mean by that? To pour metallic mercury into the water, and the mercury or water would remain odorless? The connection seems to show that he must have meant to pour a solution of bichloride of mercury into water. Another passage makes him say "hydrosybenzol;" it ought to read "hydroxybenzol;" the same also, instead of "hydrosyl," "hydroxyl."

The discussion which followed the paper of Prof. Mayr seems to have been rather extensive. We agree with him in what he says about poisons; it is as relative a term as food; anything may be a poison or a food; that depends on circumstances.

Dr. Atkinson made some summing up remarks. He "enters a caveat against men coming to conclusions without being able to justify them." Words alone will not justify conclusions; that we know well. He spoke in a general way, and we hope he will not feel how painfully this applies to himself. Dr. Atkinson might have ascertained by the simplest kind of experiments, as we have done, what gas escapes, if an abscess is treated with peroxide of hydrogen, and he would not have need to come to conclusions "without justifying them." It is nothing but oxygen with a very little amount of carbonic acid, so little that every one making the experiment will be astonished. Dr. Atkinson is correct in considering the peroxide of hydrogen a peculiar compound—H_2O_2; this is no doubt correct, but let him only try the experiment, and he will find that no "*hydrogen*" escapes; nothing but oxygen. How hydrogen could escape appears to us so unexplainable that we suppose a misreading of the stenographer who, by his phoneticism, wrote ntrg or htrg without distinguishing sufficiently between his n or h. Nitrogen would have a show of justification, if an albuminous compound, say of the type CH_2NO in varying proportions, as the albuminoids all have, would be burned up by the oxygen of the peroxide of hydrogen. We would have, expressed in a very crude and supposititious diagrammatic way,

$$C+O_2=CO_2$$
$$H_2+O=H_2O$$

N does not combine with O
O escapes with the other O.

Hence, the product would be a mixture of carbonic acid vapor, water vapor, free nitrogen, free oxygen, but no free hydrogen. We do not doubt that in this case we merely are fighting a straw-man, set up by the stenographer, and not Dr. Atkinson's own utterance.

The fact of oxygen escaping needs no theoretical foundation; it stands as such; but the process is very difficult to explain, and the whole development of oxygen in this case resembles more an explosion than anything else. The first start of decomposition given to it, either by heat, or by organic substances, or by silver dust, or platinum, and the whole amount of H_2O_2 decomposes, freeing half the oxygen in its mass; a small quantity escapes as ozone, and this is the active part when we use it in teeth; the oxygen, as such, is inert. What Dr. Atkinson said about listerine is very correct, and if Prof. Mayr referred to the preparation with its patent medicine name in any other than a merely scientific manner, he deserved to be downed. Dr. Atkinson has a remarkable gift of saying pleasant things in a pleasant and not at all odious way.

Dr. Bogue recommends the hot air as a very good antiseptic, and we do not doubt that he is correct, only it would seem difficult to go deep enough without considerable inconvenience to the patient. He also thinks that the processes in a dead tooth are exceedingly different from those in live teeth. At least, as long as both are in the mouth, we cannot agree with him in that. A dead tooth in the mouth never is completely dead until it has turned all black and crumbled, and probably a really dead tooth will not remain in the mouth many weeks; a certain amount of life will be even in the "dead tooth," and the same vital processes which go on in the living tooth will go on in the dead, only with less intensity; but, most of all, we do not believe that the enamel dies with the pulp, and in cases of successful replantation we believe that there is success only, when a living connection between enamel and periost has been established; that then at least the enamel and, by the many ramifications, also the other parts of the tooth receive a moderate amount of living impulses. Thus, whatever is said about living teeth, holds good, only in a smaller degree, also of dead ones in the mouth; the tooth is only dead when it is taken out of the mouth, and only then would we not be allowed to talk of it in the same manner as we do of the live teeth.

In the meeting of the First District Dental Society, of November 6, 1883, which, somewhat late, is published in June, 1884, Dr. Odell spoke very highly of the "mechanical mallet" of Dr. Bonwill. All those who had experience with it recommended it very much as being almost alike in its action to the electrical mallet, but much softer.

The rubber dam question occupied a large part of the session, but was very interesting and worth reading.

Dr. La Roche submitted affidavits which showed that in 1857 he applied the dam. None who invented it after that period need any more apply for recognition as to the priority. But in many such and similar simple things — eggs of Columbus* — many independent inventors, without knowing of each others' inventions, invented the same thing at about the same time; thus, as an instance, we have the ship-screw, invented in every country "first"; an Austrian, a Frenchman, an Englishman, of course an American—all have first invented the ship-screw, and so with very many minor things, even the telephone or the phonograph not excepted.

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*By the way, his name was as little Columbus as that of Jones would be Jonius. His name was Colombo.

Dr. Jarvis seems to us to somewhat pronounce a correct judgment about the inventor who keeps something to himself and afterwards complains that somebody else, who also invented it, published the thing, and himself as its inventor. There seems to us to be just retribution for selfishness of one man and for liberality of another; the selfish man does not deserve, besides the miserly gratification of his selfishness, to have the popular award of the inventor; to get that award one has unfailingly to publish a new thing and give the benefit to his neighbor.

In a clinic, platinized gold was used for fillings and was said to give excellent results.

Dr. H. E. Dennett brings forward the old, often exploded theory that the Indians have only decayed teeth since their civilization, or contact with civilized people.

Dr. Barrett, we think, has already cured the dental world, at least as far as the Indians are concerned, of this superstition. The *Cosmos*, with a fine sarcasm, immediately afterward prints a report about the weakness of the teeth of the old Etrurians, and finds them as bad as those of the present days; and yet that was 3,000 years ago, Dr. Dennett.

The *Progres Dentaire* intends to give to its readers the full benefit of translated extracts, so that they have not to buy the books. It has already printed for a year or so the translation of the book of Coleman about Dental Surgery and Pathology, and now prints also that funny little book of Quiz-Questions, by Dr. Foulks. These questions read just as funny in French as they do in English. There are some atrociously stupid ones in that book. We retranslate from the French.

Question: At what periods of life has the age any influence in the treatment of the pulp?

The most astounding, deep and never-thought-of answer reads—yes, friends, it really reads thus in print:

Answer: In youth, middle age and old age!

Pray, Doctor, why did you not follow up the deep wisdom by the next question, which ought to have followed:

Question: At what periods of life has the age no influence?

Answer: At the remaining (the embryonal and the corpse age).

Friends in dentistry! do not fail to read the funny book. Every single question includes heaps of involuntary fun, and is worth a show or Mulligan's picnic.

We do not doubt that the French journal, with the keen sense for everything funny which is particular to the Frenchmen, translates this marvelous book of printed commonplace and pinafore science for the merriment of its readers. This number does not shine by originality; of its 32 pages of reading matter, only nine are original. Three pages of these contain a report of a society, three pages an article of Dr. Peyraud about the "dosimetric" method of giving chloroform; three-quarters of a page are given to a list of the journals received, and the remainder is a correction of misprints in the foregoing number; 23 pages are translations from the English and German. This is probably very exceptional; for the French have always stood foremost for originality.

El Progreso Dental, of La Habana, April, 1884, seems considerably superior to its French brother. It contains original articles, a lecture of Prof. Poey from the dental college in Habana.*

In an article about cauterization of the pulp, Dr. Redier, whose article is published, says: "The arsenious acid is the caustic par excellence for the dental pulp. Thanks to its insolubility in alcohol and saliva (?) one may be sure that its action can be rigorously localized upon those points with which one has brought it into contact, a fact which permits to avoid accidents of periostitis, which may be observed frequently after use of liquid or soluble caustics, chiefly the chloride of zinc, which is nevertheless employed by many practitioners." What do our American brethren say about this pious confidence of Dr. Redier in his arsenic? We have heard just the opposite; in this, Dr. Redier stands about 1840.

A patriot gets warmed up because Dr. Ottofy, in the *Missouri Dental Journal*, ascribed to Spain and Cuba two dental journals, while there are four. The whole journal is worth reading.

ERRATUM.—On page 287 the ninth line should read, "there can be *no* reaction of the vital structure," etc.

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*Often misprinted as Havana.

The latest craze in regard to mercurial poisoning is that it is caused by the *mirrors*. Now this is unfortunate, for the world *could* get along without amalgam fillings and rubber plates somehow, but *mirrors !* oh, horrors ! never.

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The body of a good brave man, Dr. Gross, was cremated at Washington, Pa. He died May 6, 1884, in his 79th year, being almost all his life connected with the teaching of medicine.

The Maryland Dental College has suffered a great loss in the death —April 3d—of Dr. Keech, born January 25, 1831.

SELECTIONS.

Specialism in the practice of medicine has its justification in the enormous field and abundant fruitfulness of modern research, together with the special skill required in the use of instruments and apparatus in certain of its departments. And, whilst the technicalities of dental manipulative and operative surgery as much demand its separation as do those of opthalmic surgery, it is satisfactory to note that the teeth, like the eye, furnish a good field for exact and thorough observation and treatment. The application, already to a high degree made, to the various morbid conditions of the teeth, of scientific methods of investigation and treatment, cannot but have a beneficial influence, not only on dentistry, but also on general surgery. The exactitude which is attainable, in consequence of the accessible position of the teeth, whether in observation, in experiment, in diagnosis, or in treatment, must furnish an example of great value to those concerned with the more obscure organs and conditions of the body. The specialist, on the other hand, be he dentist or oculist, can ill afford to ignore the general methods of investigation, of reasoning and of treatment, employed by the general surgeon and physician, whose loss by lack of concentration is, perhaps, more than compensated for by his gain in breadth of view. Nevertheless, lack of concentration is a real loss. The very limitation of the area of activity enables a man to dig deeper into the mine of knowledge, and to cultivate to a higher perfection the field of practical skill. When reading or observing the best results of specialism, one feels sometimes tempted to follow such brilliant examples of thoroughness in some one department to the exclusion of general practice, but the first difficulty is that one would not know which specialty to choose, since each is so full of interest!

Specialism in study needs no apology: it is only specialism in practice that has to be defended on the ground of the practical exigencies of the case. A man engaged in the general practice of medicine or of surgery, or of both, may well make a special study of whatever class of cases he may have good opportunities for observing, or in which he may feel a particular interest. Only let him remember that whilst pursuing his hobby he is in honor bound in no wise to neglect whatever else he professes to understand. Still more is it necessary for the practitioner of any specialty that he should cultivate a wide, even if somewhat superficial, acquaintance with various kindred departments of science and practice. Otherwise he is in danger of becoming narrow-minded and even conceited (which would be highly detrimental to his own well-being), as well as overlooking important side-issues and general indications (which might be highly disastrous to his patients).

The best practical remedy, or rather preventive, for such a tendency is direct communication with men who are practising in other departments, both special and general; and one of the most important methods by which such communication may be attained, not only with the men themselves, but with their practice, is by having, at every general hospital (which ought always to be a center for professional activity) a special department in each of the recognized branches of practice. Such departments are superior, as a rule, to special hospitals, not only in economizing time and labor and expense on the part of the public (both benefactors and benefited), but also in promoting and facilitating that interchange of experience and widening of interest which tend so much to advance the best interests of the profession and the public. Another method of still wider applicability, and one which already has borne good fruit and deserves to be fostered, is by members of a scientific society uniting occasionally with those of some other society, more or less closely related in its objects, for the discussion of matters of interest to both. Such friendly scientific intercourse can scarcely fail to be useful and pleasant to both the parties concerned.—R. J. PYE-SMITH, F. R. C. S. *Dental Record*, July, 1884.

BOOKS AND PAMPHLETS.

FERMENTATION IN THE HUMAN MOUTH, etc. By Dr. W. D. Miller, Berlin.

From the *Independent Practitioner* a reprint has been made of Dr. Miller's papers about Fermentation in the Human Mouth. The little book forms a most excellect monograph about this important question. It might almost be an insult to speak to any dentist about the standing of Dr. Miller. He arrived in this country June 21, and we do not doubt that his American brethren were delighted to see the gentleman who has done so much to clear up the fog surrounding cavities of decaying teeth.

ON EMBRYOLOGY, with Special Reference to the Development of the Teeth and Contiguous Parts. By J. L. Williams, D. D. S.

Dr. J. L. Williams, of New Haven, Conn., not only a genial dentist but also a highly educated investigator, has published as a reprint from the *Dental Cosmos*, his paper on Embryology, as read at Providence, October 4, 1883, with two very fine colored plates. Part of it is a synopsis of the important embryological investigations made since 1850, but much of it is original. Dr. Williams describes in detail the process through which he went to prove the odontoblasts to be ganglionic elements; and the dental fibrillæ to be prolongations of the odontoblasts. The nerve fibers, which ramify everywhere near the surface of the pulp, can be seen with his famous immersion objective to send terminal fibrillæ into the reticulum with which the roots of the odontoblasts are in immediate connection. Dr. Williams seems to be a man fit in every respect to carry still further the beautiful investigations of Drs. Heitzmann and Bödecker. We do not doubt that Dr. Williams would send at self-cost to any one wishing it the interesting little pamphlet. Every dentist who wishes to be abreast with the progressive men in his science ought not to fail to have an extensive collection of similar monographs.

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A NEW METHOD OF TOOTH DRAWING.

A small square of India rubber, pierced with a central hole, is pushed over the tooth until the upper part of the root is reached. The rubber gradually contracts, pulls on the root, and the tooth is finally enucleated without causing any pain. Four or five days complete the operation, while very slight bleeding and slight swelling of the gum are the only inconveniences. This procedure is recommended by a dentist of Geneva.—*Med. and Surg. Reporter.*

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SOCIETIES.

Meeting of the American Dental Association at Saratoga,

AUGUST 5, 6, 7, 8, 1884.

Morning session, Tuesday, August 5th, 11 A. M.

The following words were spoken by Dr. Cary, of Saratoga:

Almighty and everlasting God, in whom we live and move and have our being, we bow before thee at this time in recognition of thy power, thy kindness and thy love. Blessed be thy holy name, that alloweth thy brethren to dwell together in unity. Blessed be thy holy name for all the gifts with which thou hast endowed us—the gifts of wisdom and understanding. Blessed be thy holy name for the gift that moveth the hearts of men to find out witty inventions for the good of thy children. Bless their deliberations, and grant to all that in their works they may be guided by thy hand and by thy power, and when the hour shall come when in thy convenience they shall close their labors here, and turn their faces homeward, wilt thou be with them. O, God, conduct them in safety. Be with their loved ones; wilt thou spread thy wings of protection over them, and wilt thou keep them in safety for the love of our Savior Jesus Christ. The love of Jesus Christ and the fellowship of the Holy Ghost be with us evermore. AMEN.

Treasurer calls the roll of permanent members, viz;

*Drs. W. H. Atkinson, John Allen, W. W. Alport, J. G. Ambler, S. H. Brown, W. C. Clark, E. Parmelee Brown, L. Morse, C. A. Frederich, Chas. F. Booth, F. C. Barlow, D. Cabe, R. Cushing, J. Crouse, J. Bunnell, C. D. Cook, B. P. Darby, A. M. Dudley, W. H. Fundberg, M. F. Fidley, G. L. Fields, G. J. Frederick, Gardner, T. L. Gilbert, J. R. Huber, A. W. Holden, T. Holmes, W. T. Hough, A. O. Hunt, S. D. Clark, E. D. Cross, R. F. Wern (?), L. C. Ingersoll, W. H. Keif, Norman W. Kingsley, Baker, James Loomis (?), James Mac Manus, G. J. Mac Kellops, G. W. Macalhenny (?), Charles Merrick, C. W. Maloney, Odell, Chas. Osgood, M. C. Peirce, J. W. Palmer, J. A. Robinson, M. Rhein, A. F. Rich, H. M. Smith, Stockton, Spalding, Swazey, J. Taft, W. H. Truman, C. L. Henn (?), J. G. W. Warner, E. A. Washburn, Will Walkford (?), Chas. A. Meeker, Arth. Hunt.

It is voted to dispense with the reading of the minutes of the last meeting.

Chairman Odell, of the committee on arrangements, outlines the programme: Daily sessions from 9.30 A. M. to 2 P. M., and 8 P. M. to adjournment; also the motion to print at the end of the programmes Section 1 of Article 3, referring to the dues, and Section 6 of Article 2, referring to the formation of sections.

The Grand Union has allowed a deduction of $1, if it is made the head-quarters.

It is further voted to have the clinic Wednesday afternoon.

Chairman of executive committee, Dr. Crouse, reports the names of the delegates from local societies which have qualified:†

State Society of Missouri, Dr. Spaulding.

Seventh District Dental Society, N.Y., Chas. Towle (?).

Pennsylvania State Society, W. H. Truman.

N. J. Dental Society, Chas. S. Stockton.

Conn. Valley Dental Association, J. MacManus, G. L. Dudley.

New England Dental Society, S. D. Hodge, R. F. Brown.

Society of the Alumni of the Dental Department of the University of Pennsylvania, A. M. Field, C. W. Galiner, Earle C. Paus (?).

First District Dental Society of New York, Theo. A. Woodward.

Chicago Society, A. W. Harland, J. N. Swazey, J. N. Crouse.

Illinois Society, L. Cushing.

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*These names being taken by ear from the reading, are not always exact.

†Taken from a poorly read report by short-hand. If of no other good, it will direct the attention of secretaries to proper reading.

Dental Society of the State of N. Y., Ambler, Rich, Work(?).
Washington City Dental Society, A. F. Hunt.
New Jersey Dental Society, C. A. Kemp, Lovey, Bear, Barlow.
Maryland Dental Association, N. F. Clummer (?), M. W. Foster.
Brooklyn Dental Society, C. D. Cook.
Kentucky Dental Association, J. Gough (?).
Michigan State Dental Association, J. C. Walker.

[From here the reading became so confused as to be unintelligible.]

Secretary Dr. Cushing moves two changes in the constitution in regard to the formation of sections, by which they are organized a day earlier.

Dr. Cushing gives as a reason for the change the fact that at the last session the attendance is usually so small, and the members are so eager to get away, it is difficult to call together a sufficient number.

Furthermore, to add to this Section 3: "Whereupon the section shall immediately proceed to the election of a chairman and such other officers as they may see fit," and to strike out Sections 4 and 5, containing provision for assigning members. The motions are unanimously adopted.

THE PRESIDENT'S ADDRESS (EXTRACT).

Gentlemen of the American Dental Association:

A quarter of a century ago a company of representative American dentists, duly appointed by local societies, assembled at Niagara to consider the desirability of organizing an American association. It was organized the following year at Washington and held single annual meetings until the present time. It was named the American Association. Its objects were well known and high. Of its original members, a few remain until the present time, honored representatives of local societies, faithfnl members of the Association which they helped to organize. Others of us, by reason of advance in years, are prevented to attend; others have finished work on earth, and passed away. Hardly a year passes that we are not called to record such deaths. To-day it becomes my sad duty to announce another — that of Dr. Buckingham. He was one of the original members of the Association and, from its organization to the time of his death, was rarely absent from its annual sessions. He was of an affectionate disposition, genial, modest and earnest; he was one whom we honored as a dentist and loved as a man.

To some this quarter of a century has passed with lightning rapidity; to others it contained years of recorded history. It is profitable to count mile-stones. What stupendous events have occurred since our organization, which have affected us as nation and as association! In the quarter of a century passed, the population of the United States has increased from 30 to 57 millions, a terrible civil war was fought, and enemies have become friends; the Atlantic cable was laid, the Pacific railroad has been built, and the locomotive whistles from Maine to the Golden Gate; our Republic celebrated the anniversary of its existence; electric light, telephone, phonograph were introduced, and arts and science obtained new additions; the colleges and schools have doubled, and woman has become emancipated. The changes in the profession were also great; in 1858 there were only 4,000 dentists in America, now there are more than 12,000; less than twelve societies then, now more than one hundred; then only three colleges, now twenty; then not one single state law regulating the practice, now no less than nineteen states have enacted laws. Then the literature consisted of a few text-books, one or two monthly or quarterly journals, and the publication of occasional proceedings. We have not less than twenty periodicals—twelve monthly, seven quarterly, and one annual—and in addition publish the proceedings of several State societies, which prove valuable additions to our literature in America. But growth is not always progress. It has been thought that the rapid increase in the dental profession has been a detriment rather, and that the schools have increased too rapidly, and that too many graduates have been sent out. There is one serious objection to the further increase of colleges, namely: the want of support. So long as dental colleges depend on the fees of students for support, so long an increased attendance is the only way to increase the resources. A preliminary examination alone can determine the point of fitness, and even then the difficulty would not be overcome, for the reason that an examination cannot embrace all qualfications of fitness; some may be intellectually well endowed, but not fit in mechanical qualifications. What these schools most need is better endowment. It is hardly expected that such a happy condition of things will be brought to pass in the near future. It would be better to have fewer schools with a larger attendance in each, and better facilities for education. If all the dentists in America would contribute five dollars each for five years to raise a fund and make endowments, and give a sufficient income to professors to devote their time to such a school in a large city, governed by trusty persons, or perhaps by a State society, it would certainly command the attention of the dental profession.

A tendency seems to exist toward the development of dental dedepartments in universities; and where they are in large cities, and where the parent school is able to bear a large share of the expense, such an union seems to promise well; but such a step is based upon the belief that dentistry is but a branch medicine; if such is the case, it should demand for graduation the degree of Dr. The dental schools of America have cause to pride themselves, when compared with a quarter of a century ago, and it is just to remember the valuable services of their teachers. This Association has the right to demand that all schools should require the attendance of more than one course of lectures. It is a fact that a meeting of dental schools has been called to fix a common standard of examinations, and it is hoped that a dental candidate for graduation must have spent two years at least in college. Another progressive change is that so many States have made laws protecting the public, some providing that the State society should appoint a board of examiners. One, of New York, has ventured to say that only graduates from certain colleges should practice. If the colleges are lax, the State should step in, its examiners should compel each man to give qualification before entering a specialty. In order to be sufficient, these appointments of examining boards should be as rigid as the examination of colleges; otherwise they would be rather sought than those of the colleges. It does not seem right that the examining board should have power to grant degrees, for this would put it in competition with the colleges, yet condemn the colleges for issuing them without a curriculum.

Another progress is to be noted in literature. It was said that all theoretical work was done on the other side of the Atlantic, and that Americans were practically proficient. That cannot be said at present. The scientific work done by dentists in America will compare favorably with that done in Europe. One has but to read the articles in the journals and papers to be convinced of the truth of the assertion. Were it not for the bread-and-butter side of life and rush to get rich, our profession would come to the front with greater evidence of its capacity to do scientific work. Editors of the dental journals have the greatest difficulty to procure good articles for their magazines, because the best men have no time.

Fault has sometimes been found with the plan of membership of the American Association, some contending that an association, made up of the delegates of State and local societies, ought to have no permanent membership, and ought to be a delegate-society only. If such a plan would work better than the one we have now in existence, would have to be determined by experiment. Prior to 1878, the work of the Association was under the management of standing committees; but some suggested a new plan: the permanent members were distributed to sections, each with a chairman. Many consider it an experiment. Perhaps it is yet too soon, but your chairman is not alone in the belief that the Association has not accomplished as much under its present system as under the old standing committees. A large number from the profession at large are constantly in attendance, but a large number are not constant; they constitute the complaining element; they work not themselves, but criticise disparagingly the work of others. Also some members appointed by the local societies come late and take their departure early. It has been urged that the time of meeting is unfavorable, that we should not convene, when the physical and mental energies are at low ebb; the difficulties at another time are so serious that few will abandon their practice to come. The needs of this Association can be embraced as to be: ***More honest work, less adverse criticism.*** (Cheers.)

Drs. Ambler, Allen and Taft are put on a committee to report relative to the death of Dr. Buckingham.

Dr. MACKELLOPS moves that a committee of five be appointed to report on that part of the president's address that refers to the number of delegates being elected into the Association. He mentioned the names of Drs. Parmlee Brown, Harland, Taft, Foster, Mackay. According to an amendment, they are instructed to report upon any part of the address.

(The motion was carried.)

Dr. PEIRCE called attention to the fact that there is a meeting of the the college faculties in a room adjoining, in the afternoon.

Committee on Publication—Dr. CUSHING—reported receipts, $27; expenditures, $30.05.

Sections 6, 2, 7, 1, 4, 3 have meetings during the forenoon.

Dr. COOK protested that names of men who are no longer members of the Association are carried on the list of sections.

Dr. CUSHING has made several times the pleasant observation that the members again joined and paid their dues whose names were kept on the list.

Meeting adjourned at 2.05.

EVENING SESSION—*Tuesday, August* 5, 1884.

Called to order at 8.10 P. M.—President DARBY in the chair.

It is voted to give a special evening to the paper and stereoscopic exhibit of Dr. Williams.

Section 6 is first to report, Dr. Harland, chairman: Pathology, &c., Materia Medica.

Only one paper in the section, by Dr. Harland himself, together with a synopsis of two new remedies. (See Laboratory of this number.)

DISCUSSION.

Dr. ODELL: That is what I call a good paper. The doctor did not mention manipulation of the gums and lets the drugs do the whole work. I have had two cases, one not long ago, where manipulation seemed to be about the only thing which benefited them. This was supplemented by the application of the galvanic current. I came to the conclusion that it was a sort of necrosis.

Dr. BOGUE: Why does Dr. Harland recommend Canada balsam at a certain stage? Can he give the rationale? And why at another point precipitated chalk and powdered myrrh?

Dr. HARLAND: The treatment with Canada balsam is before the beginning of the systemic treatment; perhaps no particular benefit is derived from the myrrh in the small quantity used, but it may disguise the taste of other things that might be disagreeable to the patient. The form of a paste seems to have the advantage of not lodging between the teeth.

Dr. BOGUE: It does not seem consistent after removing deposits to use remedies which, ex necessitate rei, must produce deposits; these substances mentioned are precipitated by water, and the effect must be to render the teeth sticky and unclean; I have noticed for many years a tendency to prescribe tincture of myrrh, but never found what it was for, and never saw the least good coming of it.

Dr. HARLAND: I have used the paste myself and never became conscious of a deposit on my own teeth and gums. I think the patient will brush away much more completely the paste than the powder.

Dr. BARRETT: With the exception of dental caries, none of the diseases of the teeth comes more frequently under our treatment than this pyorhœa alveolaris; only when we shall have understood the etiology will we be enabled to speak intelligently about therapeutics. Is it an affection of the membranes of the tooth? Is it incidental? Is it in the alveolus? Is it confined to the periosteal membrane? All this has to be answered first. Those cases which have caused me the greatest anxiety have been those in which a simple removal of any deposit and the simple application of adstringents, or cauterants, or any other class of remedies was not sufficient to reach the bottom of the disease. With one now famous person —on every board fence you see his picture—I had to make frequent operations, until I succeeded in arresting the cause of the disease; my treatment has been the removal of the edge of the alveolus, because I believe the disease to consist in caries of the alveolus; I could not call it alveolar necrosis, because there was no sequestrum formed; it was a wasting of the alveolar walls, due to a periodontal inflammation or a disease in the wall. These I believe are affected in all serious cases. I never had any success in curing, until I had established a line of demarkation; the after treatment was then only palliative. The remedy most efficacious has been chloride of zinc. I have also used the iodide of zinc. This chloride of zinc is well known to have a stimulating effect. I used it after the surgical application of aromatic sulphuric acid.

Dr. SEARLE: In what strength?

Dr. BARRETT: In the strength required by the case; sometimes saturated solution, sometimes extreme attenuation.

Dr. ATKINSON: This subject is highly interesting because it involves the principles, underlying destruction and reproduction of the tissues. I think that the value of every paper should be apprehended and pointed out by the listeners in their speeches, so as to get the greatest good from them. I am disposed to be complimentary to Dr. Harland and thank him heartily for the paper and the evidence of faithful researches. His beautiful discrimination did not seem to find lodgment in the minds of the listeners, in which he said that there was a distinction between pyorhœa alveolaris and that kind of destruction of the gums, connected with the presence of deposits of salivary calculus. Few of us distinguish sufficiently between an escharotic, a stimulant, and a tonic. All these agents have the direct influence of coagulating the albuminous portion of the tissues at the particular point, so that, by the operation of the function of laws, new tissues can be formed. But what will occur after this process of coagulation of the albuminous tissues? It is the retrogressive metamorphosis of the layer of tissue immediately underneath that which has been coagulated. The first step is one of retrogressive metamorphosis or return to embryonal conditions, and after this the type produces the tissue belonging to the parts by repeating the action of the functional movements that first resisted destruction.

The point of strength of solutions is very important; 20 grains of chloride of zinc to an ounce of water give that degree of coagulation that is analogous to that coagulation that takes place in the evolution of the chicken from the impregnated egg, that suited to the fibrillated condition of the lymph. Aromatic sulphuric acid and aqua regia, one part to seven parts of water, is best suited to that retrogression that is called wasting of the dentinal ligaments, and that is a local disease which occurs many times only on a single tooth; it will start at the margin of the gums from the point where the dentinal ligament attaches and goes to the end of the root without involving enough to approach the transverse processes; the teeth most liable are the cuspids. Where there is no deposit, either salivary, ceruminal or sanguinary, I doubt the propriety of mechanical interference, that is the use of instruments other than the injection syringe which carries any of the agents mentioned in the strength spoken of to the proper points. I agree with Dr. Bogue with what he said about the deposit of myrrh, to a certain extent. When water enough is added to take hold of the alcohol in the solution of myrrh it is precipitated.

When the small-pox blisters are opened and the serum let out, before it is ripened, there will be hardly any scar perceptible. I am reminded from the greyness of my beard, but not the coldness of my heart, or the dullness of my intellect, that I shall not have another twenty-four years to speak to this body, as I did since twenty-four years, without another incarnation. When such questions as these that lay at the foundation of our honest purposes are discussed, I would that it were possible that we were free from the wretched lead that we have found, of confining ourselves by rules, that we would seek each other, when the inspiration answers the question that would be suggested by the asking minds.

Dr. Shepard: A patient was brought to me by a surgeon; he had a specific disease and was treated for it and, as a result, had become troubled with so obstinate a ptyalism that he could not reduce it, and this had lasted for three months. The mercurial treatment had been dropped on account of this salivation. Before the commencement of the mercurial treatment his mouth had been put in order by a prominent dentist. Examining the mouth, I found a pronounced case of pyorhœa, and the patient was left with me. Pus could be expressed from the margins of the gums in all regions of the mouth, and the discharge was so profuse as to make spots the size of the palm of my hand on the pillows at night. By nothing but surgical treatment and a stimulating mouth wash, syringing with aromatic sulphuric acid, somewhat diluted, under the gums, he returned to the surgeon in two weeks' time, the gums perfectly well, the pyorhœa all gone, and the surgeon renewed the mercurial treatment without a recurrence of the trouble. The deposits under the gums were in this case very slight. I have been very much interested in the article by Dr. Harland. I would not discredit the results of Dr. Harland, but I still think that the thorough removal of the accretions, with cleanliness and syringing with zinc or aromatic sulphuric acid solution, is all that is necessary for treatment. The essayist was undoubtedly correct, and it should be emphasized still more strongly than by the succeeding speakers, that the salivary calculus and the deposits on the neck of teeth which give rise to the affection in question, are different and distinct things. This disease is found upon every tooth in the head where there is no salivary calculus and never occurs, namely the palatal surface of the upper molars, the labial surface of the upper incisors and such positions. I wish we could know something about its etiology. I do not remember to have seen anywhere an explanation of the causes, and our treatment is empirical.

Dr. Peirce: The experience which I have had leads me to certain conclusions. I have had many cases of pyorhœa and in most of them, when the conditions are found in the mouths of children, I think that they are not pyorhœa but local inflammation; they present similar features, but yield to treatment and get well, and these I do not consider real pyorhœa; but I have never met with a case of urinary calculus, without finding one or more teeth affected with pyorhœa. This fact has led me to believe that the disease is a local expression of a systemic condition, and that the deposits from urine correspond with the accumulations found upon the teeth. We find the disease between the ages of 25, 30, and 45; we find accompanying the disease, if not always preceding it, a filling up of the pulp-cavity and calcification of the tubuli, and then we find also deposits which resemble tartar on the neck of the teeth. This indication precedes the breaking down of the alveolar processes; it precedes the exudation of pus from the alveolar socket, and precedes the inflammatory condition of the gums. An effort has been made to stop the progress by drilling into the pulp-cavity and devitalizing the pulp, supposing by that to stop the progress of the disease, but it was not found an effective treatment. I do not believe that the disease can be cured, but the progress of the disease can be modified, and the teeth kept from ten to twenty years by careful treatment. By wiring the teeth to neighboring ones they may well be kept in the mouth, but the patient has to come every three months, and the pockets have to be thoroughly washed out with aromatic sulphuric acid on a stick, shaved down so as to resemble a spatula. This aromatic sulphuric acid also removes any accumulation on the neck of the teeth. These accumulations I believe to accompany the disease by virtue of the systemic condition, but not being its cause. By their presence they act as an exciting cause, stimulating further progress.

Dr. Rhein: I have had a number of cases where constitutional treatment of some kind relieved the patient, but after the treatment had stopped, a recurrence of the trouble took place; invariably in these cases a slight deposit was around the neck of the teeth. Very few patients keep the teeth thoroughly clean; it is almost one of the impossible things, and with patients, suffering of this terrible disease, this point becomes so much more imperative.

Dr. Field: The assertions of Drs. Harland and Shepard that there is a marked difference between pyorhœa and salivary calculus seem to be something we want to understand more about; never an analysis of this deposit was made. We know what salivary calculus is, it has been analyzed. But we do not know what the deposit of pyorhœa is. How can the essayist and my friend from Boston reiterate so strongly that both affections are entirely distinct? I feel more powerless in the treatment of this disease than anything that comes under my hands. I would like to know the diagnosis, where the one begins and the other ends. Dr. Harland himself could not tell in a case where pyorhœa and salivary calculus come together. The only difference that I could see was that salivary calculus was harder and denser than the deposits of pyorhœa.

Dr. Odell: I think the indiscriminate use of aromatic sulphuric acid to be likely to result in a good deal of injury. I gave to one of my patients a weak solution of aromatic sulphuric acid and allowed him to use it and the result was that the first right central, being the tooth I was at work upon, did not exactly get lost, though it lost all its pericementum way up to the apex, but it took also the other central, which was all right, about one-third away. Chloride of zinc is worse still. Dr. Atkinson mentioned the fact that, if you treated small-pox right you are all right and not marked; I had it very lively; you could not put a pin to my face without hitting one, but few now would see it, and only on close inspection a mark may be seen here and there.

Dr. PIERCE: If I made the impression that I recommended the use of the aromatic sulphuric acid, indiscriminately for patients, I made a wrong impression. My remarks will show that this was not what I meant. Most patients affected with this disease crave acid drinks; a lady even used lemons at night.

Dr. ALPORT: I would state that I have used eugenol in the treatment of an eruption of the skin, which resisted all other treatment, with success. I consider the pyorhœa entirely constitutional in the large majority of cases, but the disease of tartar may be entirely local. In most cases of pyorhœa alveolaris there are other evidences of debility in the system; the poison breaks out and this is the outlet. In many cases it is connected with urinary diseases. Also bacteria are found there; we find them in the deep pockets; the disease cannot be treated locally only; just like an abscess which will recur, if the trouble is systemic, so is this disease. The eugenol is a powerful germicide, and also a stimulant, hence it probably acts in both ways. Chloride of zinc acts in a similar manner.

Dr. TRUMAN (being granted the privilege of the floor): I never heard a more absurd proposition promulgated than that this disease is produced by deposits of tartar; I have endeavored to investigate this matter for the last 20 years, ever since Magitot gave to the disease its name, and when he recommended chromic acid for treatment. What is pyorhœa alveolaris? Is it anything more than a local irritation aggravated by systemic conditions? In my judgment it is nothing more than an alveolar abscess translated from the apex to the neck of the tooth, in other words, an irritation of the pericementum; as a consequence we have absorption of the alveolus. How is it produced? Not by pressure, if I understand it. What then does produce it? What is pus? Pus is leucocytes—wandering cells. What are these wandering cells? They are amœbæ. What is the function of the amœbæ? It is absorption, and in proportion as we have amœbæ, we have rapid absorption of the tissues; that is my judgment. What do we have at the neck of the teeth? We have irritation of the pericementum, we have then pus.

Adjourned.

MORNING SESSION—*Wednesday, Aug. 6, 1884.*

Called to order at 10 A. M., President Darby in the chair.

The privilege of the floor is granted to Professor Chas. Mayr, of Springfield, and to Drs. Bazin, Lovejoy, Borden and Andres, of Montreal. The discussion of the paper of Dr. Harland, of the previous session, is continued.

Dr. SHEPARD: I would request all speakers to be exact in their expressions; I, myself, said yesterday: "dilute sulphuric acid;" that was inexact; I should have given the strength. I meant the proportion of one part of sulphuric acid to three of water.

Dr. ATKINSON: If dilute sulphuric acid meant one part of acid to three of water, that would be much stronger than aromatic sulphuric acid tincture.

Dr. SHEPARD: I meant aromatic sulphuric acid.

Dr. ATKINSON: That is just why I meant that the gentleman should also be exact.

Dr. SEARLE: I love to ask the questions, Why and What? In the first place, why use these various remedies for pyorhœa alveolaris? I think we have not gone deep enough into the nature of the disease. We hear it said sometimes that decalcification and caries are synonymous, also pyorhœa and decalcification. They are both diseases of the soft tissues, the lime-salts have nothing to do with them. If I have right studied pyorhœa, I would declare it a disease of the pericementum. Originally it is set in action by some irritant, and that irritant may be tartar, lower organisms, or mechanical irritation; but, whatever may be the cause, the disease starts in the pericementum and works itself far down between the alveolus and the pericementum, before it makes itself manifest at all; the disease has been operating usually for a long time, before we notice it, and, unless we can apply our remedies to the special parts affected by the disease, we might just as well throw them on the sidewalk. We all know that ptyalism and the various affections of the mucous membrane are not pyorhœa. We know that inflammation is not the disease in question, until it progresses to a certain stage. Now, where does pyorhœa commence? We cannot define exactly at what point of the inflammation of the pericementum the disease commences, but probably during the stage, when the pericementum itself becomes involved in the disease. If the tooth is extracted, the tissue is so changed that you can hardly separate the changed pericementum and cementum. *To cure the disease,* we have to remove all foreign matter, you have to go down to the point of union between healthy and diseased tissue, and to treat it as a disease, not as an injury; you have to recognize it as a disease and treat it as such. How shall we treat it? After removal of foreign matter, we dress it like any other wound as nearly antiseptically as possible. If it is a germ disease or not I do not know, but in some cases it may be and deserves as much an antiseptic treatment as all similar diseases. The best antiseptic (Lister) dressing I am acquainted with is carbolic acid, full strength, or some other coagulator, and applied, as stated last night, far down to the point of union between diseased and healthy tissue. What more can you do? The teeth cannot rest, you cannot apply a plaster as to an ulcer of the skin; in these ulcers around teeth the carbolic acid itself will form a coating by coagulation, which will keep out extraneous matter; it is virtually a Lister dressing. How about the method of repeating the treatment every few days? I would say: Let it alone most severely. Having once performed an operation, amputated a limb and dressed it, you let it get well alone. Give nature a chance, do not disturb it. Somebody spoke of the application of external friction; this I think perhaps the best way of removing food substances, etc., that lodge accidentally between the alveolus and the roots of the teeth. Let your patient place the finger low down and move it up, so as to compress the tissues, and then rinse the mouth with a bucketful of water.

Dr. STOCKTON: It does not seem necessary to say any more about the subject, as any one keeping the ears open last evening evidently knows everything about the subject. One gentleman, very prominent in the profession, said it was a matter of deposits that could be cured by remedies, another said it was not a matter of deposits and could not be cured by remedies; one said a saturated solution of an acid would cure it, the other said there was no such thing as a saturated solution. I do not know any more about it than I did before coming. I thank Dr. Harland for his paper and hope he will give us the etiology of the disease another year.

Dr. HUNT expresses thanks for the paper, considers the disease constitutional, and thinks people and tribes who live simply in accordance with nature, have better teeth.* Also he considered the disease as one of the symptoms of urinary troubles.

Dr. SEARLE: Cases on which I have been pegging away for five or eight years have yielded in short time to strong carbolic acid.

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*This is an old and thoroughly exploded notion.

Dr. Pierce: I did not mean to say that urinary calculus was the cause of pyorhœa, but the systemic condition which is cause for one disease, is also for the other. There are cases of pus in the alveolar socket, due to local causes; these removed, the disease will subside. The disease is hereditary in many cases. I think, if you make inquiries among your patients, you will hear them tell that "father and mother lost their teeth in the same way," "all the teeth of father and mother came out without decay, all sound," etc. I do not believe in the transmission of diseases, but of tendencies.

Dr. Watkins: Dr. Pierce thinks the disease cannot be cured; I would like to give a case where I think I cured it. It was one of the incisors, elongated, pressed out of position, surrounded with pus pockets everywhere except one small space, the labial surface; the tooth was very loose; I examined it and found a very little tartar about half way up the root; I removed this and the border of the alveolus which was necrosed; I applied aromatic sulphuric acid full strength; a week afterward the patient came again; I found that I had overlooked a small spot; I treated this in the same manner and dismissed the patient; this was three years ago, and the tooth is still sound in the socket.

Dr. Howe shows a few instruments, one a syringe with a fine platinum tube, the other a scaler to remove deposits by pushing or pulling, and the sides shaped to scrape the diseased alveolus.

Dr. Harland: The differences between salivary calculus and pyorhœa are great. In the first affection the pericementum has not been detached beyond the line of deposits, in any event the salivary deposit is all around the neck of the teeth and continuous, not broken up into islands, to say so; the pericementum cannot be lifted from the root of the tooth beyond the line of salivary deposits. Whatever may be the initiative of pyorhœa, if mechanical, chemical, traumatic, or anything else, it has a beginning at the gingival margin, at the ligament surrounding the neck of the tooth. It is believed, in connection with this injury, that micro-organisms of a peculiar form are found, that they manufacture a soluble ferment which destroys the tissues in advance; if that theory be correct, it is necessary that a remedy to destroy these micro-organisms be injected. The reason for the frequent injection is, that the remedy you use may destroy the developing organisms, but not destroy the spores, so that in three or four days it would be necessary to repeat the injection and so on, until all spores have been destroyed. Dr. Black of Jacksonville has advocated this theory. It is no wonder that Dr. Pierce comes to the conclusion that the disease is not curable, if he used only one remedy, which, as he himself said, could not be applied in all cases. I have received hundreds of letters from all over the U. S. I have visited the colleagues in their offices who said to me they were trying the treatment I recommended and asked me to see the patients, and, when I asked for the remedies and instruments, to show how to manipulate the instruments and to use the remedies, they did not have them. How can a gentleman expect to accomplish anything unless he himself will faithfully try and be honest! It is no criticism against a method or treatment, if the criticizer himself does not practice or attempt to practice what is advocated. (Cheers.)

Dr. Brown: There seem to be two grounds taken in this discussion, the one that pyorhœa can be cured, the other that it cannot. Now let us take an intermediate ground. Who would think to condemn a physician, because, when he cured a sore throat, it recurred in a year, nor, if any one had cured pyorhœa alveolaris, and the tendency or disease reappeared in three or four years, the dentist. It takes generations of treatment to cure the disease and eradicate it. The child says: "Mother's teeth dropped out and sister's did; fearing the disease, I come to you." The question is not whether it can be cured permanently. Dr. Harland is right, he has cured cases, so have I, and so have we all, but can one tell what the cases will be in five years? Many will recur. Does a man allow his house to burn down because it caught fire three or four times while the neighbor's stone house never caught?

Dr. Shepard: From my observation I think the disease can be wiped out in the first generation. Taken in the incipient stages it is as curable as any disease; there will be no loss of the alveolar processes. Patients should bring their children to us in early life; the tendencies, as Dr. Pierce said, are hereditary; we need to watch for them. The term pyorhœa, meaning originally pus-flow, is used now also to mean the loss of tissue and the inflammation; the section of nomenclature has not been used in the proper direction.

(It is moved to pass the subject.)

Dr. Atkinson: If we care to know anything about it, we had better tarry where we have most need of light, and not pass the important subject for mere formulæ. We are now exactly in a position to get some conceptions in advance of the mass of nonsense that has overloaded all functional activity in healthy and unhealthy modes of expression, and I would be sorry to have so interesting a subject passed.

Dr. KINGSLEY thinks all has been said that the eminent practitioners in the meeting knew about the disease.

(Discussion is continued.)

Dr. ATKINSON: We have heard a good deal of sense and of nonsense; some have classified disease in the plural before they have defined it in the singular, and they have got so entangled in perception that we have had a hodge-podge of brilliant perceptions so intermingled as to be made worthless. Let us get our minds to the point of what a disease is, and how it acts, and whether it is capable of being limited or annihilated. There is such a thing as antidoting of diseased activity which is the result of the introduction of foreign elements into the functionary body. Every phlegmonous abscess is self-limiting and self-curing; it will go in the direction of the least resistance; if the flow of pabulum by pressure is prevented it will abort. Why does not pyorhœa alveolaris heal? It is the introduction of micro-organisms which float in the air that set up a ferment adverse to the formation of tissues, so that they might be built after the type of the tissue. I cured a case of twenty-four years' standing of a man from Taunton, Mass., in eight days. I then used wood creosote. What is recurrence? It is either recurrence of imbecility on the part of the investigator or malevolence by persisting in a wrong position. Those cases of which we speak as recurrences are merely territories, only enclosed a little but not healed, in which the bacteria had sufficient oxygen to keep them alive, and they broke down the tissue, until it makes its way by the recuperative law and breaks through on to the surface, or takes another way of curing, which is encystment, whereby the foreign body becomes a mineral like bullets in the body, remaining encysted for years. I have in my own person a splinter of wood that has become resorbed so much that I can find it only occasionally. When you have removed the body inimical to the organization, that organization alone does cure. Anything may be, according to the organization; a food, a poison, or a remedy.*

Dr. BARRETT (chairman of section 7) gives the report of this section. In an excellent paper he reviews the last investigations into the collections of ancient skulls. From the Tropics to the far North, with one single exception, the same diseases existed which exist nowadays. These investigations are fatal to the theory that dental lesions are of modern date. We eat more phosphates even in the whitest wheat flour than we need.

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*Our space does not allow us to give this excellent speech entire; rather than mutilate it we have omitted the remainder.

Some *very interesting* tubes are passed around, containing pure cultures (made by Dr. Miller) of at least four different fungi occurring in the mouth; microscopically, the fungi look pretty nearly alike, but, by the manner in which they grow and affect the gelatine in which they are bred, they show their differences. The tubes are test tubes, having at the bottom sterilized gelatine, inoculated with the peculiar fungus and closed with a tight cotton plug. Some of these tubes show the fungi growing in strings, others show only a general cloudiness, in others the contents are liquified; one of them, well isolated by Dr. Miller of Berlin, produces the decalcification of decaying teeth by the lactic acid it generates.*

Prof. CHAS. MAYR: Almost all the differences in the different views about caries seem to come from an indefiniteness of what and where the caries really is. If a patient comes to you with an aching tooth is the ache the caries? Certainly not. Or the tooth? Again not. Or the plug you dig out? Not at all! But while you were excavating, the patient first said nothing, then he became nervous and complaining as you reached a certain point, which inevitably again disappeared when you reached healthy dentine. The "caries" comprises therefore only that small diseased layer, probably not over $\frac{1}{100}$ of an inch thick, which was sensitive; outside we have the worthless plug or corpse of the tooth substance; inside the healthy or only sore-feeling tooth. Dr. Miller seems to have mostly examined the corpse, and produced the corpse, but not enough that extremely small border line. In an abscess, the pus is not the seat of the disease, nor the inflamed tissue underneath, but that small layer of tissue where the physiological—or if some fogies like the word better, pathological—processes are going on, and the study of this layer will enlighten us about the abscess, but neither the pus or the inflamed tissue underneath, will tell us much.

Dr. ATKINSON:† What is a process? It is a going on of something. What is a thing? A thing is a think. Pathology is only perverted physiology. The function of building a tooth is its evolution, the decay, decadence its downfall. Thanks to Carl Heitzmann and to the angel that squeezed him from Rokitansky's laboratory and sent him over to us, the most ignorant may work now as intelligently as such *anges*. The typal order of the enamel is a modification of that of the dentine; the enamel is really a living tissue as shown by the presence of protoplasmic strings between the enamel rods. The bacteria are not found in the basis substance but in the tubuli of the dentine, going towards the pulp. There are bodies that we have not seen with the highest power of amplification and concentration of light; we may call them ghosts; the ghost of the bacterium is there before the bacterium can begin, when we can color them we only deal with the tracks of ghosts; but the tracks would not feed us; we want to have a ghost for dinner. "Miller was honest." Do you know that it is the greatest insult to a man to have it said of him that he is honest? I would rather like to take five hundred boys of fifteen years of age, that have a good English education to understand my English and agree to make them good anatomists, physicists, pathologists, therapeuticists, and operators in five years than five graduates. Why? Because the latter have said: Error, be thou my truth! Darkness, be thou my light! That is what they have done from the pope down.

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*These cultures were highly instructive and valuable, and the complete report about them ought to be read by every practitioner.

†We wish everybody would read the full speeches of Dr. Atkinson in the final report. Their fine logical web cannot be extracted. We only give a few aphorisms from this one.

Dr. Spaulding: I have long held the opinion that there is no pathological science except preceded by physiological science, that there is no pathology per se, and that there are no such things as pathological functions, processes and growths; they are physiological functions, processes and growths out of place. Our text-books are full of "pathological" when there really is no such thing. It is the inversion of true physiological forces that produces the exhibition of pathological growth.

Dr. Barrett: We spent considerable time this forenoon soaring in the infinite. Let us come down to a cash basis. We come here not to study or consider ghosts, but material things. We all love to hear Dr. Atkinson, but the question up now is not to study the tracks but the game. Let us get down to the actual demonstration and actual experiments. We cannot speak of the power of a bacterium as that of a raging animal, boring into the teeth for the purpose of devouring living tissue; that is not the character of the fungi of caries; they are of a vegetable nature. Putrefactive and fermentative conditions are almost the converse; putrefaction does not exist the same time with fermentation. For every one experiment Professor Mayr has made Dr. Miller has made fifty. According to my own stand-point, the rationale of decay is about like this. First, there will be the decalcification of the exterior portion of the enamel; after the decalcification of the enamel the dentine is reached and at one—maybe single—point, the lime-salts are removed, the substance becomes a spongy mass which takes up within its pores saccharine fluids from the mouth, which are favorable to the development of fermentative fungi; these fungi are in the spongy mass. In the course of their existence, they produce an acid which Dr. Miller proved to be lactic acid, which continues the work of decalcification and so ad infinitum.

Dr. Abbott: Dr. Barrett said we ought to deal with actualities and not with ghosts. What we have been able to discern with the naked eye or the strongest power of the microscope, does this put us into the position to say that there is nothing beyond? It was only a few years ago, that microscopes which magnified five hundred diameters were something wonderful, remarkable; but there must be something smaller and smaller—as Dr. Atkinson said, a ghost. Dr. Miller seems to neglect the fact that the tooth has 25–30% of organic material and is a live organ, and considers too much the inorganic salts.

Sections formed and adjourned.

Evening Session.

Paper and exhibit of Dr. J. Williams of New Haven.

Speaker demonstrated how the former explanation of the growth of the enamel-pulp and the dental groove were due to faulty preparations. The paper was very elaborate and, without the illustrations, of little instructive value. We can only advise our readers to get the full report about it. It is exceedingly worth reading, and we do not remember to have listened to as lucid a demonstration of the intricate and dry microscopic detail of the development of the enamel, as that paper of Dr. Williams.

Dr. Atkinson: I can hardly restrain my joy at the progress made in dealing plainly and simply with the most profound research and interpretation of the manner in which the elements of the teeth are brought within the scope of our perception. Let us delectate a little upon the manner in which we have been blessed by this very rare treat, the chairman of the committee of arrangements had the good fortune to secure.

The accident which happened to the child of Dr. Clifton, of Watchoo, (?) Texas, is reported, and the Association passes a vote of sympathy, the president of the town is introduced and promises to act vigorously in the matter.

Dr. ATKINSON proceeding after this interruption, Dr. SPAULDING thinks it might be untender; but Dr. Atkinson replies: "The best way to show the sympathy is to go right ahead in our duty." Dr. Atkinson also adds some more historical explanation as to the difference between the conceptions of the school in Philadelphia and Dr. Williams.

Adjourned.

MORNING SESSION—*Thursday, Aug.* 7, 1884.

The committee appointed, reported a proper resolution relative to the death of Dr. Buckingham. Drs. Fredrich and Stockton also pay oratorical tributes to the dead professor.

Dr. F. Y. Clark is admitted by unanimous vote, as a member of the Association, from which he had resigned in former years.

The following list of delegates is reported additionally:

New England Society, Drs. Searle and Blake.
Illinois Society, Dr. Wason.
Missouri Society, Dr. E. T. Smith.
Maryland Dental Society, Drs. Friedrich, Clump and Keech.
Brooklyn Society, Dr. R. Carr.
Odontological Society of Pennsylvania, Dr. Jaffries.
Iowa State Association, Dr. A. O. Hunt.
Sixth District Dental Society of New York, Dr. Stowell.
Lehigh Valley Society, Dr. Winkler.

Dr. Crowell read a statement to the effect that a protective union of dentists against fraudulent patent claims ought to be formed; he invites all to a mass meeting in the afternoon.

The discussion of the paper of Dr. Barrett is continued.

Dr. PIERCE: I think Dr. Barrett has not quite understood the position of Dr. Miller. The latter says, in an article in the *Independent Practitioner*, "A most powerful influence, which we do not understand, is exerted by the living processes in the teeth themselves." And in a similar manner in the *Cosmos*. We have similar facts in the diseases of the plants. Some years ago the potato rot prevailed so, that in a few weeks thousands of bushels of potatoes were spoiled and had to be thrown away; in this year there came a long drouth after the potato had begun to grow, and afterward warm weather, that made them grow rapidly; now, the germs of the potato rot are present every year, but the potato itself is not so ready to offer to them a habitation one year as another; farmers know these influences well; if, during the growth of wheat, foggy, damp days come, the farmer says, "my wheat will be rusty;" not because the germ is not there every year, but because it got an opportunity for development. We all can recall cases where teeth have decayed rapidly, and, without the aid of the dentist, the decay has ceased, its color has become dark brown; but the germs were there all that time.

Dr. BARRETT: No one feels more than I that Dr. Miller cannot be present. Dr. Pierce seems to think that Dr. Miller considers the micro-organisms only as incidental; Dr. Miller asserts directly the contrary.

The president of the village reports that everything has been done to bring the man who ran over the child of Dr. Clifton, to justice.

Dr. ATKINSON: I think it is well to discriminate how far we have gone in the matter, and how sharply we have apprehended the laws we are dealing with, in striving to get at the truth. If all the organisms that are found in dental caries, are also found where there is none, we must assume that there is some sort of energy that has to be present, to awaken this activity by which the caries is produced—ergo, they are not the initiators of the actuality. Is that a clear proposition, or not? Then, I am justified in saying that we have a ghost; an unseen current of nutrient activity is the first stage of the movements which assist in bringing about the process of decay.

Dr. SEARLE: As I understood Dr. Miller to say, he asserts that the lime-salts and the basis-substance are chemicaly united to form the dentine, and that the same vital force which originally united them, under certain circumstances of ill health breaks down this union. This is all the recognition he gives to the action of the vital forces in the dissolution of the lime-salts. He has not recognized the organisms as directly attacking the fibrils of the tooth. The term "bacteria" is comprehensive and includes micro-organisms which may just as well belong to the animal as the vegetable kingdom.

Dr. F. Y. CLARK: Dr. Miller has done very able and valuable work for our profession and deserves all the thanks his efforts entitle him to. I myself have been making experiments in the same line of Dr. Miller, but I did not succeed. My opinion is that the bacteria produce caries of the tooth by absorption of the bioplasson or living substances in the mesh work of the tooth. I think that there are life-cells and death-cells, and that there is a continued fight between the two sets.

Dr. DABOLL: I had the pleasure of meeting Dr. Miller in New York. I think the doctor is somewhat misunderstood. One of the charms of his papers are the successive steps in which he proves the way the organisms act. Dr. Miller not only has satisfied himself that caries is the result of fermentation, but he has produced caries. It took Dr. Miller two years to get pure cultures of fungi. One of these pure cultures he used to produce the decay of teeth out of the mouth.

Dr. SEARLE: I understand that putrefaction and fermentation are different processes; putrefaction I understand to be the fermentation of albuminoids and fermentation to have for its object farinaceous substances. In the tooth both processes are going on simultaneously, and that explains why we have in teeth both sets of organisms. Some act upon the albuminous, and others upon the farinaceous substances.

After this speech of Dr. Searle, the discussion becomes somewhat muddled and loose, and the subject is finally dropped.

The section on Artificial or rather Prosthetic Dentistry, Dr. TRUEMAN, chairman, reports.*

Another paper by Dr. JOHN ALLEN recommends the continuous gum work as far superior to anything.

Dr. ROBINSON: "Be not the first by whom the new is tried, nor the last to throw the old aside." It does not follow, because a dentist has made a set of teeth, tolerably comfortable and well fitting, that he is competent, nor because he has filled a cavity with gold; that does not prove that he is a competent and good dentist. There is art, poetry and science in the dental work; the true artist lives a perennial glory in his own imagination, for labor is only the visible form of imagination. It is seldom that natural teeth, however homely, can be made better, without lessening the character of the face. It is the combination of artist and mechanic that makes a good dentist. One of the essentials is to make one's own instruments.†

Report of section on Dental Education — Dr. PIERCE chairman.

Dr. PIERCE reviews the work of the meeting of professors of dental colleges requiring now two terms in all colleges, not to be taken in the same year.

As the subject has been discussed so very often in the same manner, and as the speeches were mostly full of enthusiasm which does not get justice from the cold type metal, we omit the discussion upon this subject, which was quite interesting, and which was participated in by Drs. Spaulding, Hunt, Friedrich, Alport, Cook, Abbott, Shepard, Rhein, and Atkinson.

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*Report was not intelligible in the middle of the hall.

† The paper is very enthusiastic, and like most such papers cannot be well given in extract. We have to recommend to our readers the original.

The following resolutions are adopted:

1. That all dental institutions should require that the candidate of graduation should attend two courses of lectures before graduation as D. D. S.

2. That candidates, before being admitted to graduate, should obtain proper proficiency in their studies.

3. That a thorough preliminary examination should be required.

4. That, in reiterating these views, so often expressed, the Association is gratified that the association of faculties at their recent meetings has been in accordance with them.

Adjourned.

Afternoon Session.

No agreement was reached as to fixing rules for delegates to be admitted. The title of Section 1 is changed from "Artificial Dentistry" to Prosthetic Dentistry.

Dr. Taft (report upon literature — extract): During the last two years our literature has received much that ought to be recorded. It is within the knowledge of every member of this body that many principles and incidents of much value never see our literature through the medium of written or printed pages for various reasons. Some excuse themselves by supposed or real inability to write, a few attach very little importance to their own productions, others fear to run the gauntlet of criticism, which is sometimes used with undue severity. How often is the statement made that the larger part of our literature is trash and not entitled to special consideration, and that it would be far better that all books would be destroyed, and that we should have to begin anew? Such criticism is not healthy. I think journalism should be specialized. It might seem practical to have one or two journals in the country devoted to the interest of association work, one or two to professional education, others to oral surgery, operative dentistry and prosthetic dentistry, including metallurgy and chemistry, others to pathology and therapeutics. This would give individuality to the periodicals. A year ago the *Missouri Journal* ceased to exist and was followed by the *Archives*, one of the independent journals, of which our literature has had quite an addition during the years 1882 and 1883. The third edition of James A. Garretson's Oral Surgery has appeared—a book which has been regarded as a standard work in our profession; we would think that the work is sometimes overloaded with cases, and it would perhaps also be better to have two volumes instead of one.

Prof. MAYR: Perhaps the gentlemen would like a few remarks about the literature of other countries. I received a good number of dental journals from everywhere; from England I received three kinds, one of them containing interesting accounts of club-dinners, toasts and similar interesting dental matters; another contained very windy speeches about legal stuff, which may be all right in detail, but, as the whole foundation is absurdity, has no real bottom.

Austria, a country of about 40,000,000 of inhabitants, almost one-half of them Germans and other civilized nations, has no dental journal at all.

The French journals are remarkably poor for that nation, so promnent in many directions; the most important is run by Ash and Sons of London. It contains remarkably little originality, almost nothing but translations and reprints.

A most curious little journal I received from Sevilla, Spain, issued "with the approval of the bishop!" Well, the contents correspond to the high quality (?) of the authorizing dignitary. It was not worth reading.

The German journals have made great improvements since about two years; quite a number of them are issued and they contain excellent theoretical and practical original articles.

One Spanish dental journal in Cuba is quite good and worth reading.

Dr. DARBY, chairman of Section 4, reported and presented the following subjects for discussion:

A new method of packing gold, as recommended by Dr. Herbst, Germany; he proposes to consolidate gold by a smooth instrument, revolving with great rapidity, with much less pain and inconvenience for the patient. Speaker read a letter from Dr. Bödecker announcing the sending of teeth with gold packed into them according to the Herbst method; but the teeth did not arrive.

A second interesting subject for the discussion is the electric or incandescent light, its uses in the dental practice.

The third subject is the combination of gold and some baser metals.

Fourth, the danger of excessive dryness, consequent contracting and subsequent expansion of the enamel or dentine of the tooth, when the rubber dam and hot air syringe are used. The point was lately brought out in one of the state societies and caused a good deal of earnest discussion. We have gentlemen here who know something of Dr. Herbst's method of packing gold with revolving burnishers.

Dr. ABBOTT has seen teeth filled very well by this process; the instrument has a little bulb, shaped according to the cavity. I have used for many years burnishers of the shape of a tomato for the purpose of condensing the last pieces of gold with the engine; in wheeling around they strike the gold quite hardly.

Dr. HUNT: Is this gold cohesive or non-cohesive?

Dr. ABBOTT: My impression is it was cohesive; I would not be positive about it

Dr. DABOLL: Dr. Miller, when here, gave us a little account. He stated that he had filled several teeth himself in Dr. Herbst's office. The gold is perfectly soft; it is a different gold from what we have; for proximate cavities he made a matrix, which he fastened by the use of shellac, and then he introduced the gold in large masses and packed it without the use of retaining points with a revolving instrument; a large cavity was filled in ten minutes; a test with aniline showed that there was very little leakage, if any.

Dr. WATKINS was very much interested and secured a set of instruments, burnishers of different shapes, small cone-shaped ones, etc. The gold is so-called magnetic gold. It is similar to that sold by Williams, which he termed electric. Dr. Timm gave a clinic and filled a large cavity, using a revolving instrument from beginning to end; the filling was well condensed and put in as nicely as with any other instrument. Dr. Bödecker filled a tooth for me, an upper wisdom tooth with a very large cavity, one-half of the tooth with Bonwill's mallet, then with the lead mallet, then with the automatic mallet, and about the last one-sixth he put in with a burnisher of bloodstone, gotten up by the Whiting Manufacturing Company for Dr. Weal (?) of Albany, who had the idea that gold would not adhere to the bloodstone; the inserting of this last part of the filling into my tooth was just love in comparison with the mallet; there did not seem to be any strain on the tooth. Dr. Weal's idea is, if a cavity has to be prepared with a bur, that a bloodstone, corresponding in shape to the bur, can secure perfect margins. Also an agate burnisher is a fine thing in burnishing the surface of a filling instead of steel; the agate does not seem to break down the walls of the cavity.

Dr. MacKellops: Immediately after the appearance of the article I sent for a set of instruments; I think they are not polished but only made smooth. I do not understand exactly the manner in which Dr. Herbst uses the gold; if you anneal it, it becomes adhesive.

Dr. Barrett: I have had limited experience: the gold is exceedingly soft; non-cohesive, soft gold. An entirely new method requires long practice to conquer. The gold is the Wollrad gold; the instruments are smooth, not polished, and bur shaped; the point may become plated, and Dr. Herbst keeps by his side a piece of block tin upon which he rubs his points every little while, and thus keeps them in good order. Although Dr. Herbst makes also contour work, I think the method is not as well adapted for that kind of work as for cavity fillings. This Wollrad gold comes in rather large cylinders.

Dr. Hunt experienced considerable difficulty; found that the gold would not hold in the cavity until he used quite large quantities at a time; fine emery cloth will give to the instruments the right kind of polish. The rotating burnisher is not pressed continuously on the gold but only interruptedly. I have used what used to be Jones's 1,000 fine, a soft foil; also Williams's gold foil worked well.

Dr. Alport sees just enough fascination in method to make it attractive, and enough to make it bad; he supposes it to be like the plastic gold of Justi, very few use it now; the gold fillings made by this method will be apt to leak.

Dr. Parker thinks that the quick rotation makes the gold cohesive.

Dr. Clark put some fillings into the mouth, some thirty years ago, with round dull points rotated by hand.

Dr. Rhein thinks the speed of the instrument heated and annealed the gold in his case.

Adjourned.

Morning Session—*Friday, August 8, 1884.*

Called to order at 9.30.

Spirited voting for next place of meeting. On the first ballot the vote stands: Chicago, 15; Minneapolis, 21; Long Branch, 23. The final vote is Minneapolis, 40; Long Branch, 25; Minneapolis is declared the choice. In the vote for president, Dr. Crouse received 38 votes, Dr. Barrett 6, Dr. Stockton 14, on the first ballot. Dr. Crouse is declared elected. For first vice-president, on the first ballot, Dr. Foster 22, Dr. Stockton 8, Dr. Field 8, Dr. Rich 5, Dr. Kingsley 4, Dr. Odell 5, the remainder scattering; on the second ballot, Dr. Foster received 39 votes and is declared elected. For second vice-president, on the first ballot, Dr. Rich 23, Dr. Odell 15 votes, the remainder scattering; on the second ballot, Dr. Rich received 28 votes, Dr. Odell 10, remainder scattering; Dr. Rich is declared elected. For recording secretary, Dr. Cushing is unanimously elected; for corresponding secretary, Dr. Harland the same. The vote for the executive committee stands: Dr. Hunt 39, Dr. Shepard 26, Dr. Pierce 24, Dr. MacKellops 11, Dr. Field 11,t he remainder scattering; Drs. Hunt, Shepard and Pierce are declared elected. A credit is voted to Dr. Clifton for the extra expenses, necessary by the accident to his child.

Dr. Dudley: The following delegates have qualified:

New Jersey State Society, Dr. Chas. Holbrook.

Brooklyn Dental Society, E. C. Wadsworth, G. M. Farrar.

Ohio State Dental Society, B. Gibbons.

The report of the treasurer, Dr. Kelly, showed:

On hand, August 10, 1883,	$1,647 70
Received dues since the last meeting,	225 00
At this meeting,	565 00
Total,	$2,427 70
Disbursements,	613 77
Balance on hand of	$1,823 93

The usual votes of thanks are voted to deserving railroad companies, etc. A commnnication from a New Jersey society about the pardon of a "dentist," well known in other less legal vocations to some members present, is returned without thanks; the N. J. Society evidently did not know what kind of a man he was.

Returning to the unfinished business of Section 5, Drs. Abbott and Pierce made some remarks and criticisms. During the reading of the minutes of the last session the intermezzo with Dr. Rhein occurred, for which we refer our readers to our editorial part.

Adjourned.

EDITORIAL.

AT SARATOGA.

If a physiognomist had stood at the steps of the town hall in Saratoga, during the days of August 4, 5, 6, 1884, would it have been possible for him, without looking at the signs of dealers, from the character of the faces of the men entering, to see what professionals were gathering here? They were no ministers, in spite of a few white neck ties and black cylinder hats; no school-masters, for they looked too prosperous; no trades people, although white beavers were quite numerous; they might have been taken for physicians, but they did not show hollow conceit and mental impertinence enough to be that; it would have been very difficult to make out the character of the meeting.

The meeting of the American Dental Association was opened by prayer (?) by Dr. Cary. We know we will not agree with all on this point; but it cannot be helped, not any more than we would accept the views of the pope upon dental caries. All such hired prayer and pietastery, be it Catholic or Protestant, is popery, only popery in mental form; the man who was invited to pray did not know the least thing of what he was praying for, and what the dentists wanted; he gave a general soft-soap babbling—we print it verbatim in our number. If dentists come together and want a prayer, they want one to the point. What have dentists to thank God for? For caries, malformations and toothache! Their whole profession would be annihilated without them. What have they to pray for? For more caries, more malformations, and more toothache; for they are the foundation of their business! Just as the farmer wants the dominie to pray for rain, which hurts the sailor, for high prices of his goods, which press on the mechanic,—so the dentist, if he is sincere and honest, can only pray for those things which give him his "daily bread." The god who created decay will not take it amiss, if we pray for more of it; but he created the first decay without one prayer, and it is perfectly insane to suppose that a few insipid words will have the faintest influence upon the production of a single more decay or a single richer patient, than we would have had without these words; one sentence of Atkinson, grating harshly upon the ear of the "liar and scoundrel," is worth miles of the oily, windy, word-conglomeration of the salaried prayist in the service of Catholic or Protestant popery; we are certainly not mistaken that the majority of the meeting was against the introduction of this "prayer," but, bowing to custom, they were too polite and tolerant toward the few who were in favor of paid enthusiasm. Let the majority show as much grit in rejecting that worthless custom of hiring an enthusiast by business, and let a Dr. Atkinson or any of the members say a few appropriate words, if needs be, words which will not be attempts to boss God's business, but evidences of the speaker's own enthusiasm, which alone inspires others: Verba movent, exempla trahunt; words move only, but examples drag you along.

There was less red tape displayed at the whole meeting than we ever saw before at similar gatherings. The method of excluding all nominations for candidates has great advantages from a business stand-point; but is apt to favor lobby influences. The great popularity of the president for the coming year was shown by Dr. Crouse obtaining a majority on the very first ballot, without any special work for his candidacy. On the other hand the choice of the executive committee, while resulting excellently in three strong men being put on it, showed the strength which a combination may have, without any appearance of it on the surface, before voting. The balloting for the place of the next meeting was quite spirited, more so than usual. Was there not a little bit of selfishness in those voting for Long Branch?

The stereoscopic exhibit on Wednesday evening was very fine, and the scientific centerpiece of the whole gathering; the speaker, who illustrated his paper, Dr. J. L. Williams of New Haven, is a man much easier underrated than overrated.

Dr. Atkinson, the soul and heart of the convention, was never in a better mood, and his speech on Wednesday, part of which we give verbatim, was worth all the prayers ever spoken. He spoke more clearly and more convincingly than ever before, and while we may very much disagree with him in *his* conception of inspiration and intuition, he never fails to leave us improved in something, with some new ideas infused. Dr. Atkinson's influence upon the profession seems to be not so much in the number of new appliances, mallets and pluggers, which he has invented, or the material wealth which he personally derived from his efforts, but in the wealth which is that of all enthusiastic souls, from the philosopher of Nazareth down to our days, namely, no abundance of earthly riches but an immense wealth in the kingdom of mental entities. It is through his zeal, his unquestionable sincerity, enabled by his perfect freedom from clique connections, and his immense richness in mental possessions, that he is the mental Vanderbilt among dentists. Poor Vanderbilt, with all his bonds, could not—if otherwise possible—induce Dr. Atkinson to exchange his mind for the horse-fleshy, coarse-grained and vulgar skull-stuffing of the New York millionaire, if he had no power to transform and beautify this exchange.

Dr. BARRETT is another such enthusiastic man, but in a different vim; the bump of cautiousness seems to be small in Dr. Atkinson, but it is certainly large in Dr. Barrett; he moves hesitatingly, where Dr. Atkinson dashes, but underlying Dr. Barrett's efforts is not any less enthusiasm. He seems to have the devotion to a friend most especially developed; and, in spite of the many toes he is forced to step on, and consequent fault-finding of their proprietors, he sticks to his friend, and his own deep conviction of the friend's and his own value. Dr. Barrett's features express the practical, large-hearted man, who, disdaining to make compromises and in the feeling of his physical and oratorial strength, accepts successfully the challenge of a whole host.

For practical and enterprising ability, Dr. SHEPARD is probably a model; all his make-up is expressive of the successful practical spirit which looks at the speculative dreams from the stand-point of his well earned reputation as one of the most successful dentists in the invention of simple appliances.

Dr. SEARLE, who never before took an active part in the discussion, seems to have made up his mind to let the profession have some of the wealth of experience gathered during a practice of almost half a century,

Dr. ALLPORT, another prominent practical dentist, showed, for a man from Chicago, an unexpected self-denial; he spoke against Chicago as the place for the next meeting and recommended Minneapolis. Would he have recommended with as good grace St. Louis?

Dr. HUNT of Washington represented the boys in gray before the convention. We do not doubt, if there was a standing army of any size to speak of in the United States, that Dr. Hunt would be an officer in it; we have seen that face in the standing armies of all nations; it expresses duty without any further question, and ability to direct the efforts to the best point. His statements at the mass meeting, held Thursday, August 7, were perfectly in accordance with the soldierly dress he wore.

This Mass Meeting brought out another powerful enthusiast in the person of Dr. Dwinnell of New York. The meeting opened with over one hundred of the most prominent dentists in the United States in attendance, but Dr. Dwinnell drove a good horse too long and tired out the members; not, that the matter was not interesting or highly important and considered so by all men, or that Dr. Dwinnell had not the full sympathy of the meeting: in his zeal, he was so carried away, that he did not notice that he was telling the same thing over and over again. Dr. Dwinnell described the transactions of the Richmond Tooth Crown Company and the peculiar way in which dentists were induced to pay licenses for patents, after it was proved that they were obtained by perjury. The alleged inventors themselves became victims of a legal sharper; all the plans of the extortionists were so well explained, that it became the duty of all dentists present to give their full support to this meeting. Dr. Crowell was in reality the secretary of the mass meeting, although Mr. Zeiss, who is no dentist, was designated as its secretary. It was resolved to appoint two members from each state to canvass all the dentists of the Union to contribute toward their common defense. The causes why dentists are forced to pay fraudulent licenses seemed to be: First, The skill of the lawyers of the fraudulent patent owners in picking out men who, from financial weakness, have to let the case go by collusion. Second: The ease with which one United States Circuit judge considers the decision of another judge as binding for him; this might be properly called judical laziness. Thirdly: The clumsiness and difficulty of getting things into and through the Supreme court; the legal aggressor is plainly in the advantage by this defect. Fourthly: The incompetency of the respective patent examiners who are only patent granters. Fifthly: With the great power of even fraudulent patents such protective unions, as well pointed out by some in this mass meeting, often squander their means in defending all the small detailed attacks of the impostors, instead of making the one and only safe move, to have the patents declared frauds. If the law furnishes no redress, rather "boycot" such fraudulent patents and the object of their fraudulent claims, until a final decision could be obtained. Dr. Hunt seems to have been a special sufferer in former years and in the fight against the rubber patents.

For the first time we met at this meeting Dr. Spaulding, the editor of the *Archives*. How one may make mistakes in one's fancy! Not being familiar with the history of dental works beyond a few years, we thought Dr. Spaulding a young man somewhat like Dr. Harland, but he is one of those with "gray beard, but not a cold heart or dull intellect." He is of an Atkinsonian turn of mind, only less fiery and intuitive.

A very necessary and important man was Dr. ODELL, the genial New York dentist, who, as one of the members of the executive committee, was more than many others responsible for the success of the meeting.

But we cannot close, without telling the story of a promising young man who afforded a good deal of amusement in the well-known sport of getting sat upon, namely, Dr. RHEIN. Many of us have been at church sociables, and in a mild manner a similar game is played there, which affords much amusement; with great skill and evident practice it was also played to cheer the dying moments of this year's convention. Dr. Rhein is a young, earnest and courageous dentist, apparently looks still younger than he is, who will be a power in the future, and that little downing will only do him good. Every man likes much more to pay a bill, when we present it to him with a smile, than when we say: you have got to pay this bill! it is my right, and "I demand it!" Almost everybody feels as if bound by duty and cussedness to fight that bill, and that was what happened to Dr. Rhein. There could be no shadow of doubt that, in the principle, he was correct, and every court would sustain him, but the form in which Dr. Rhein asserted his right, was exactly calculated to induce the majority to have a good sound sit down. No harm was done, Dr. Rhein's zeal will not be abated, let us hope; to him the excellent lecture of Wednesday night from Dr. Williams was due; he worked as chairman of that section to secure it, etc., and he will come out gloriously when scores of the older members have shared the fate of old Cæsar; but he will learn that right by itself is not what the majority will acknowledge, it must be asked in a begging form. As things went, the result was comical enough. He, the chairman of Section 4, when making his report was ruled out by the president, because he introduced his report by the mentioning of names, and had the intention of expressing thanks to Dr. Williams; but, even before it was clear what he was going to say, the president did not give him time to have his say, but right away declared him again out of order, whereupon—like every other dentist—he withdrew, leaving the convention without any report from its own fourth section! The president was sincere, but to outsiders appeared too quick in his decision, shooting at the bird, before it had yet fairly come within his reach; he made the bird only flutter and enlisted sympathy in its behalf. As we are not giving the minutes we are not under obligation to abide by the vote of the majority not to mention this whole little fun in the minutes.

The feature of the first evening's session was Dr. HARLAND's paper on pyorhœa alveolaris, a very clear, concise work in which the only fault we could find was, the love for prescriptions. He was one of the most grammatical and logical off-hand speakers in the convention; his paper was discussed extensively for two sessions.

Dr. BARRETT showed in the report from his section on etiology samples of pure culture of micro-organisms by Dr. Miller. They were evidently not appreciated, and there was no doubt that this detail was a trifle beyond the information of the majority; the scepticism was far more powerful than even Dr. Barrett's rhetorical skill could cope with. In defending this subject he met with less approval than we ever saw at any former occasion accorded to this, doubtless important and earnest man.

The veteran of the germ theory in America, who has stood much ridicule for it in former years, Dr. F. Y. CLARK, was also present as a member, and had the satisfaction that at present probably not one member doubted the general truth that, at the foundation and for the practical dentist only to be considered, micro-organisms are the cause of decay. The oxygen and ammonia speculations were without a defender; not one member spoke of them.

In the morning session of Thursday the subject of dental literature received careful treatment from Dr. TAFT, and the president, Dr. DARBY, as chairman of the section on operative dentistry, outlined the subjects for discussion in this section, which, however, was prevented by the closing of the meeting.

The painful accident which happened to the child of Dr. Clifton of Texas, which was run over and very badly injured about the head and neck, was made the subject of anxious care on the part of the Association; it expressed its feeling in proper manner by putting the hands in the pockets and voting material support by granting a credit to Dr. Clifton.

The *New England Journal* feels especially bound to thank the convention for granting the privilege of the floor to a man, not a dentist, but connected somewhat with its editorial staff; and to Dr. F. Y. CLARK, who nourished, guarded and sheltered him.

Many prominent men at the convention would deserve special notice, but space and patience of our readers do not permit us to do so. Long may the association live and prosper!

THE METRIC SYSTEM IN PHYSIOLOGY.

BY CHAS. MAYR, A. M.

What enormous advantages this system has in this branch of science over the wild, absurd, crude English measures, which the Americans have adopted or rather conserved with such an ill-deserved piety, may be seen from the following. There seems to be a secret conspiracy of schoolmasters and all the old fogies to make the metric system appear as large and complicated as possible, so as to let the foot, firkins, mile, etc., not appear too absurd. But all this theoretical complicatedness does not appear in practice. Only the following divisions are used:

Measure of length: 1 mm. (millimeter) = about $\frac{1}{25}$ of an inch.
10 mm. or 1 cm. (centimeter) =about .4 of an inch.
1000 mm., or 100 cm., or 1 m. (meter) = about $3\frac{1}{3}$ of a foot.
1000 m., or 1 km. (kilometer) = about $\frac{2}{3}$ of a mile.

Measure of surface: 1 □mm. (1 square millimeter) = $\frac{1}{600}$ of a □inch.
1 □m. (1 square meter) = 11 □feet.
100 □m. = 1 are (for land meas.) = 1,100 □ft.
100,000 □m. = 100 ares (1 hectare) = 3 acres.

Measure of cube: 1 cdm. (1 cubic decimeter) or 1 liter = 1 quart.
1 cmt. (cubic meter) or 1000 liters = $1\frac{1}{3}$ cubic yards.

Liquid: 1 liter (about 1 quart).
100 liters or 1 hectoliter, for beverages in casks, etc.

Weight: 1 mgr. (1 milligram) about $\frac{1}{60}$ grain,
1000 mgrs. or 1 gr. (1 gram) about 16 grains,
1000 grs. or 1 kgrs. (kilogram) about $2\frac{1}{4}$ lbs.
1000 kgrs. or 1 ton, exactly 1 ton of 2200 lbs.

Heat: Thermometer Centigrade. Water freezes at 0°, boils at 100° c.

One caloric is the amount of heat required to heat one kilogram or liter of water at about ordinary temperature by 1° c., say from 1° c. to 2° c.

All the other subdivisions are only used by people not familiar with the system, and cranky persons; there exists the nicest relation between all these measures, and without any hesitation, a problem like the following may be solved mentally by any one knowing the metric system, while we defy almost any foot-system defender to solve it in his system without paper.

If a gallon of sulphuric acid weighs 14.4 pounds, how many gallons in one ton?

In the metric system the same problem reads:

If one liter of sulphuric acid weighs 1.8 kgrms., how many liters in 1000 kgrms.?

The problem in the foot-system includes the possibility of three kinds of gallons and tons.

It is an especially simple one, nothing complicated about it.

From the *Progreso Dental* we copy figures in the metric system concerning physiology. Our readers will find the table very convenient to refer to.

Dr. Octavio Gourges gives this synopsis which is worth knowing.

The heart weighs about 265 grams.

The weight of the blood is about $\frac{1}{13}$ of that of man, hence about 5–6 kgrms.

The loss of $\frac{1}{5}$ of the blood is sufficient to kill a man; a man dies after having lost 1.2 liters of blood.

The human heart propels with every contraction 180–200 grams of blood, with a pressure of $\frac{1}{4}$ of the atmosphere or about 19 cm. mercury.

The velocity of the blood is 35cm. a second.

An injection of a deadly amount of a poison into a vein produces death in 15 seconds; into the skin in 4 minutes.

The size of the blood corpuscles is 7 micromillimeters and their thickness 2 micromillimeters.*

The breathing surface of the lungs is 200 square meters. Man breathes about 14–16 times a minute.

The quantity of air breathed in 24 hours is about 10 cubic meters.

The quantity of oxygen absorbed by the body is about 500 liters in 24 hours; the carbonic acid gas given off 400 liters, or sufficient to vitiate in one hour 4 cubic meters of air.

The length of the digestive canal is seven times the length of man or about 11m.

Liquid secreted in 24 hours by the human body:

Saliva, 2 liters,

Gastric juice, 6.2 liters,

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*A micromillimeter equals 1-1000 millimeter. This micromillimeter is far superior for microscopic measures to the fractional divisions of the inch, because of its smallness and definiteness. 1-25,000 of an inch equals 1 micromillimeter.

Bile, 1.3 liters,
Pancreatic juice, 1.8 liters,
Intestinal juice, 5 liters,
Perspiration, 1.3 liters,
Urine, 1.5 liters,
Total, 19.4 liters.

The heat of the human organism amounts to 2,000 meter calorics each day; that is, 20 liters of water heated to 100° c.

The height of a tall man is about 1750 mm. to 1900 mm., short people about 1300 mm.

The temperature of the body is 37° c.

The surface of the human body is 175□ cm. (square centimeters).

To live in good health and keep his weight an adult man ought to consume, daily, in the average:

Meat, 480 grams,
Bread, 470 "
Fat, 100 "
Water, 440 "

The bones of the skeleton number 198 (?), the muscles 500.

MISCELLANEOUS.

TO THE DENTAL PROFESSION.

After the adjournment of a special meeting of the First District Dental Society, held in the city of New York, July 2, 1884, on motion of Prof. Frank Abbott, a mass meeting was organized for the purpose of forming a Dental Protective Union.

On motion of Prof. Frank Abbott, Dr. William H. Dwinelle was elected President.

On motion of Dr. A. L. Northrop, Dr. W. A. Bronson was elected Treasurer.

On motion of Dr. A. L. Northrop, Dr. John M. Crowell was elected Secretary.

The officers were appointed a committee to inform the dental profession of the formation of the Dental Protective Union, which has for its object the protection of the dental profession from unjust prosecution for infringement of so-called dental patents.

The committee request all dentists who are threatened with prosecution to inform them of the fact, that they may investigate the matter, and advise them of their rights and aid in their defense.

All communications to be addressed to the Secretary,

Dr. John M. Crowell,
No. 104 West 42d Street, New York City.

OPERATING TABLE AND LABORATORY.

PYORHŒA ALVEOLARIS.

Dr. Harland gives a continuation of the paper of last year, bringing out some more details suggested by numerous inquiries. Speaker is gratified to know that his efforts have been so spontaneously recognized, and expresses acknowledgment. Many in the profession are very likely to confound salivary deposits on the lower incisors or on the palatal or labial surfaces of molars with pyorhœa alveolaris; these are only in a slight degree the cause or associated with this affection, except in incipient cases. In all cases of abundant discharge, there may be observed a loss of tissue on the processes around the teeth, whereby their symmetrical outline becomes irregular and finally leads to extensive destruction of the bone.

It is not a disease of old age, not any more than of youth or middle age; I have seen it as early as the ninth year, and several times before the sixteenth year; I am unable to say at what period of life it is most frequent; my experience leads me to think that between the ages of 25 and 40 it is most frequent. Pulpless teeth do not escape the ravages; users of tobacco are not less liable to attacks than those who do not use it; one of the worst cases occurred where it never was used. In the course of the disease, the teeth twist, change position, protrude, and, if thoughtlessly extracted, the features may be greatly altered. The fact remains that a vast majority of cases is unaccompanied with salivary calculus. In most cases, the gums have a purplish color, corresponding to the shape of the pockets. As regards the treatment, experience has shown the necessity to use brooches of extreme delicacy to examine the pockets for their depth, sanguinary deposits, etc. If salivary calculus is found, it is removed, and the patient treated with a mixture of

Pinus canadensis,	½ oz.;
Aqua rosae,	1 oz.;
Eugenol,	30 drops—twice daily.

To remove the calculus, I use Cushing's scalers; with ten or twelve instruments, all necessitating a pushing motion, one is fully equipped for the removal of any deposit. In addition, two or three properly shaped excavators are necessary to scrape the edge of the alveoli. A fine-pointed syringe is needed, not too sharp, with the opening at an angle instead of at the point. $H_2 O_2$ (hydrogen peroxide) ought to be injected immediately after removal of deposits or excision of the edges of the processes. I use also iodozinc in solution, 3 to 48 grains to one ounce of water, and begin by the injection of three or four drops into each pocket, after the injection of $H_2 O_2$. I have also used eugenol and sanitas oil in place of hydrogen peroxide. I direct my patients to brush the gums with a stiff brush and discontinue the use of the pinus canadensis after the beginning of the systemic treatment of the pockets; loose teeth are bound together with binding-wire of silver, platina, or gold; at the beginning, the patient is required to apply once in four days. Should constitutional treatment be called for, this is also used. When the suppuration ceases, the injection of hydrogen peroxide is discontinued and a dentifrice of the following formula employed:

Precipitated chalk,	2 oz.;
Orris root,	2 oz.;
Castile soap,	½ oz.;
Powdered borax,	½ oz.;
Powdered myrrh,	½ oz. (?)

Glycerine and honey, enough to give a paste.

If desired, I add about twenty drops of eugenol. It will be found a valuable addition. After the fourth or fifth visit, the interval may be larger—once a week, and so gradually increased. As stated before, in all cases of pyorhœa with pain, iodoform made into a paste with oil of cinnamon and oil of eugenol is an excellent anæsthetic. I have also had good results from injection of a weak solution of chloride of alumina, one to two grains to one ounce of water. Iodochloride of zinc, a saturated solution of iodine, wood creosote, iodoform, eucalyptol, a diluted alcoholic solution of menthol have been used, but I prefer the first-mentioned remedies.—*Paper of Dr. Harland, at Saratoga, Aug.* 5, 1884.

ON EUGENOL AND SANITAS OIL.

Eugenol is nothing but the principle of oil of cloves. It is known among chemists and in the dispensatories as eugenic acid. It is prepared by decomposing eugenate of potassium with sulphuric acid; it is rectified and obtained as an oil of low specific gravity. It has the odor of the oil of cloves and the composition $C_{10} H_{12} O_2$, it is not decomposed at ordinary temperature, has no tendency to become thick on exposure to air, or to precipitate a sediment. It may be diluted with water or alcohol. It is a powerful parasiticide. When applied to an exposed pulp, the pain is greatly reduced and soon ceases altogether. If the cavity is previously washed with biborate of soda, it is probably the best dressing for slightly inflamed pulps, not excepting the various iodoform pastes. It may be injected into fistulous tracts and the hole sealed immediately. It is necessary that the root should be thoroughly filled. I have injected three drops into the interior of an epulis, and in three weeks it disappeared. As an injection into the root, it should supersede all the powerful coagulators; diluted with water, 1: 1000, it forms an agreeable dressing and may be substituted for $H_2 O_2$. With proper precaution, it may be injected full strength into an abscess without danger.

Sanitas oil is obtained by the oxidation of oil of turpentine. We know a great many oxidation products of it. It is produced from turpentine floating on water, by directing a stream of heated air on its surface. It contains an empyreumatic oil and a substance probably identical with $H_2 O_2$. It possesses oxidizing power equal to a ten volume solution of $H_2 O_2$, and may be considered as a convenient method of storing $H_2 O_2$. In it we have a germicide of the first rank. Combined with volatile oils, it gives a dressing which is disinfecting, antiseptic, and not poisonous. It has the odor of fresh pines, which may be disguised by oil of gaultheria, eugenol, or eucalyptol, but a large volume is needed. It has been used for injection in the pyorhœa pockets, in the treatment of alveolar abscesses, and as an ingredient of mouth washes, for the treatment of recent wounds, and as a dressing over exposed pulps. It is soluble in alcohol and ether, and some of the essential oils. Both may be procured: Eugenol from Seward & Merks, and sanitas is made by the Sanitas Company, in London, England, imported by Sargeant, Chicago. (Cheers.)

Paper of Dr. Harland, at Saratoga, Aug. 5, 1884.

MONTHLY LIST OF PATENTS.

For Inventions relating to Dentistry, bearing date July 22 and Aug. 26, 1884. Reported expressly for this Journal by Louis Bagger & Co., Mechanical Experts and Solicitors of Patents, Washington, D. C.

301,237. Dental engine—W. S. How, Philadelphia, Pa.
301,722. Dental engine—W. A. Johnston, Clifton, N. Y.
312,430. Dental engine hand-piece—J. Roque, Philadelphia, Pa.
302,629. Dental breath-guard—W. C. Foulks, Philadelphia, Pa.
303,870. Dental engine hand-piece—E. T. Starr, Philadelphia, Pa.
303,890. Manufacture of dental plates—C. C. Carroll, Baltimore, Maryland.
303,171. Dentist's chair—M. L. Long, Philadelphia, Pa.
302,949. Inhaler—R. Skene, Louisville, Ky.
303,723. Dental engine hand-piece—H. S. Grace and W. A. Miller, San Francisco, Cal.

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ORIGINAL COMMUNICATIONS.

A CONDENSED HISTORY OF HISTOLOGICAL OBSERVATIONS.*

BY FRANK ABBOTT, M. D., NEW YORK.

It was appreciated in a measure by Aristotle, who was born 384 years before Christ, that animals and plants, however complex their organization, are composed of a limited variety of elementary parts constantly recurring. It seems, however, to have been more clearly conceived by the father of medical science, Galen, who lived 400 years later. Aristotle distinguished as "partes similares" those structures, such as bone, cartilage, fat, flesh, blood, lymph, nerve, ligament, tendon, membrane, vessels, nails, hairs and skin, not confined to one part of the body, but distributed throughout it generally. He applied the term "partes dissimilares" to the regions of the head, neck and extremities. We are indebted to Fallopius of Modena, 1523 to 1562, for our knowledge of the conceptions of Galen, in regard to these "partes similares." These, however, do not correspond to the "elementary parts" or cells of Schwann. Prof. Huxley says in his essay on "The Cell Theory," "they were ultimate to Fallopius because he could go no further, though it is, of course, a very different matter whether we are stopped by the imperfection of our instruments of analysis, as these older observers were, or by having really arrived at parts no longer analyzable." These "partes similares" really correspond to the "tissues" of the present day, which are collections of elementary parts. That the Egyptians knew something of the magnifying properties of lenses, as well as the Greeks and Romans, over 2,000 years ago, seems quite probable, from the fact that a table of refractive powers is introduced into his "Optics" by Ptolemy. Aristophanes, the Athenian poet (B. C. 500), speaks of "burning spheres" of glass as sold in the grocers' shops at Athens, and both Pliny and Seneca refer to lenses and their magnifying properties. Some of these lenses have been found in the ruins of Nineveh, Herculaneum and Pompeii. Compound microscopes, however, did not become available till about the year 1590, about which time Jansens, father and son, are said to have invented it. Fontana, in 1646, writes that he had invented the microscope in 1618. Galileo, in 1612, is said to have sent a microscope to King Sigismund, of Poland; whether it was of his own invention or not cannot be determined. Whoever the original inventor may have been, it is certainly impossible to estimate the assistance this instrument has been to succeeding generations in opening up the minute structure of animals and vegetables. Prof. Huxley says: "The influence of this mighty instrument of research upon histology can only be compared to that of the galvanic battery in the hands of Davy, upon chemistry. It has enabled *proximate* analysis to be *ultimate.*

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*From the Transactions of the Dental Society of the State of New York, 1884.

The time prior to the invention of the compound microscope may be considered as the *first period* in *histology;* that between this date and that of the observations of Schleiden and Schwann (1838) the *second period*, and since that time the *third period.* Barellus, of Pisa, seems to have used the microscope in the examination of the structures of higher animals about the year 1656.

According to Boerhaave, Swammerdam had recognized the blood-corpuscles in the frog in 1658. Malpighi, between 1661 and 1665, had seen the blood-corpuscles in the hedge-hog, had witnessed the circulation of the blood, and had published observations upon the minute structure of the lungs—which he compared to a racemose gland—of the kidneys, spleen, liver, and membranes of the brain.

In 1757 Haller made the first intelligent attempt at building up the tissues by an ultimate physical element, to correspond with the "atom" of the inorganic chemist. "He resolved the solid parts of animals and vegetables into the 'fibre,' and an 'organized concrete.' To the former he assigns the most important position, asserting that it is to the physiologist what the line is to the geometrician; that a 'fibre' in general may be considered as resembling a line made up of points having moderate breadth, or rather as a slender cylinder." In 1759 to 1774 Wolff promulgated a theory, given as follows by Prof. Huxley: "Every organ is composed at first of a mass of clear viscous, *nutritive fluid*, which possesses no organization of any kind, but is at most composed of globules. In this semifluid mass cavities are now developed: these, if they remain rounded or polygonal, become the subsequent cells, if they elongate, the vessels; and the process is identically the same, whether it is examined in the vegetating point of the plant, or in the young budding organs of an animal. Both cells and vessels may subsequently be thickened by deposits from the 'solidescible' nutritive fluid. In the plant the cells at first communicate, but subsequently become separated from each other; in the animal, they always remain in communication. In each case they are mere cavities and not independent entities; organization is not affected by them, but they are the visible results of the action of the organizing power inherent in the living mass, or what Wolff calls the 'vis essentialis.' Two points are here to be particularly observed as cardinal—first, the non-independence of cells, either anatomically or physiologically; that they are effects, *passive results*, and *not* causes of a vitalizing or organizing force; second, that organization takes place from the 'differentiation' of the homogeneous living mass in these parts through the agency of the 'vis essentialis' or inherent vital force."

Among the first to express himself clearly upon the cellular or vesicular composition of animal organisms, as well as vegetables, was Oken, who, in 1805, in his work on "Generation," speaks of elementary parts as "vesicles," and who says, "The first transition of the inorganic to the organic is the conversion into vesicle which I in my theory of generation have called 'infusorium.' Animals and plants are throughout nothing else than manifoldly divided or repeating vesicles."

In opposition to the "fibre" theory, then so prevalent among histologists, the "globular" theory was advanced in 1779. It is true that Leuwenhock, as early as 1687, announced the "*globular*" structure of the primitive tissues of the body, but this theory attracted very little attention until this period of reaction against the "fibre," when it claimed the attention of Prochaska (1779), Fontana (1778), the brothers Wenzel (1812), Treviranus (1816), Bauer (1818, 1823), Heusinger (1822), MM. Provost and Dumas, and Milne-Edwards (1823), Hodgkin (1829), Baumgartner (1830 to 1842), Frederick Arnold (1836), Dutrochet (1837), Raspail (1839); all except Hodgkin admitting, in greater or less degree, the importance of the globule as an ultimate physical element. It seems at the same time that no little confusion existed in the use of terms, the words *globule*, *granule* and *molecule* being often indiscriminately used.

It should here be mentioned that in 1828, Dollinger announced that the tissues of the body are built up of blood-corpuscles, which move in walless channels in these tissues.

It would seem from the foregoing facts very evident that for some years previous to 1838 the cell had been recognized as a constantly recurring element in vegetable and animal tissues, though little importance had been attached to it as an element of organization. Raspail tells us in 1837, that in the condition of development, there are vesicles or cells endowed with life and the property of reproducing out of themselves other cells of the same structure and endowments.

Previous to this, however, a most important discovery was made, viz: the "nucleus," by Dr. Robert Brown, of Edinburgh, 1833. He failed, however, to appreciate its importance, though its discovery was another fact added to those necessary to complete the data on which has been founded the so-called "cell theory."

The pre-existence of the nucleus, and the gradual development of the cell about it, Valentin attempted to demonstrate in the case of pigment cells, C. H. Schultz in the blood-corpuscles, Rudolph Wagner in the egg, and Henle in epithelium, all before the works of Schleiden had appeared. Valentin too, had said, when describing the nucleus of epidermic cells, which he first pointed out, that they reminded him of the nucleus of the cells of vegetable tissues. Dr. Waldo J. Burnett states Valentin "perceived the true physiological relations of cells as far as he well could without apprehending the grand fact that the nucleated cell is the fundamental expression of organic forms."

In the year 1838, Schleiden pointed out the formation of cells in vegetable structures, according to a single and uniform method, and elaborated the theory of development of which the cell was the unit, and which Schwann immediately applied to animal tissues. One obstacle, however, presented itself in the way of a law of development, applicable alike to animal and vegetable tissues, namely, that animal tissues are furnished with vessels, in which respect they essentially differ from plants; an independent vitality being ascribed to the elementary particles of vegetables growing without vessels. This obstacle had, however, been in a measure removed, in 1837, by Henle, who showed that an actual growth of the elementary parts of epithelium took place without vessels. Taking up the nucleus as discovered by Dr. Robert Brown, Schleiden in referring to its function, gives it the name of "*cytoblast*." I will not weary you with the conclusions which he arrived at, as to the formation of cells, their reproduction, etc., etc., but will refer you to Tyson's "Cell Doctrine," from which much of this paper is quoted.

The merit of Schwann consisted in applying the theory of Schleiden to animal tissues. Thus, in a "*cytoblastema*" (cell contents), either structureless or minutely granulous, "a nucleolus is first formed; around this a stratum of substance is deposited, usually minutely granulous, but not at first sharply defined on the outside. As new molecules are constantly being deposited in this stratum between those already present, and as this takes place within a precise distance of the nucleolus only, the stratum becomes defined externally, and a cell nucleus, having a more or less sharp contour, is formed. The nucleus grows by a continuous deposition of new molecules between those already existing, that is by intussusception. If this go on equally throughout the entire thickness of the stratum, the nucleus may remain solid; but if it go on more vigorously in the external part, the latter will become more dense, and may become hardened into a membrane, and such are the hollow nuclei. At a certain stage of development of the nucleus the cell is formed around it, to wit, a stratum of substance, which differs from the cytoblastema, is deposited upon the exterior of the nucleus. In the first instance this stratum is not sharply defined externally, but becomes so in consequence of the progressive deposition of new molecules. The deposition of new molecules between those already existing proceeds, and is so effected that when the stratum is thin the entire layer, and when it is thick only the external portion, becomes gradually consolidated into a membrane."

"Immediately that the cell membrane has become consolidated its expansion proceeds as the result of the progressive reception of new molecules between the existing ones; that is to say, by virtue of a growth by intussusception, while at the same time it becomes separated from the cell nucleus. The interspace between the cell membrane and the cell nucleus is at the same time filled with fluid, and this constitutes the *cell contents*. During this expansion the nucleus remains attached to a spot on the internal surface of the cell membrane." In this manner, according to Schwann, the animal cell is formed. He believed that the cell wall was the most active constituent of the cell; that it possessed the power not only of producing physical and chemical changes in its own substance and the cell contents, but of secreting materials from the surrounding substance and depositing them in its interior; thus it was that glands secreted, and fat was formed in some cells, pigment in others, etc. etc.

From 1840 to 1846, Henle, Bergman, Reichert and others, published the results of observations, but their conclusions were so nearly in accordance with those of Schwann that it would be too much of a repetition here.

In the same year, 1840, Martin Barry made some interesting observations, in the publication of which he states "that the germinal vesicle (the nucleus) and its contents constitute throughout the animal kingdom the most primitive portion of the ovum," that the germinal vesicle returns to the center of the cell, etc. Again he says, "the germinal vesicle fills with cells, and these become filled with the foundation of other cells, so that the germinal vesicle is gradually rendered opaque."

In 1845, Prof. John Goodsir published his paper on "Centres of Nutrition," in which he clearly grasped the two important principles of the modern Cellular Pathology; first, the activity of these centers (nuclei), their power to draw from the capillary vessels, or from other sources, the materials of nutrition, and to distribute them by development to each organ or texture after its kind; second, the origin of such centres, or nuclei, from previously existing nuclei. "From this it follows, not only that the entire organism, as has been stated by the authors of the cellular theory, consists of simple or developed cells, each having a peculiar independent vitality, but that there is in addition a division of the whole into departments, each containing a certain number of developed cells, all of which hold certain relations to one central or capital cell, around which they are grouped. Again, a nutritive center, anatomically considered, is merely a cell, the nucleus of which is the permanent source of successive broods of young cells, which from time to time fill the cavity of their parent, pass off in certain directions and under various forms, according to the texture or organ of which their parent forms a part."

In 1853 to 1855 the observations of Remak were published. They consist mostly, however, of a discussion of the manner in which new cells are formed. We have already alluded to Prof. Huxley in connection with Wolff. We find, however, in the same paper (1853) some views of his own which in this connection are worth considering, to wit: "Vitality the faculty, that is, of exhibiting definite cycles of change in form and composition, is a property inherent in certain kinds of matter. There is a condition of all kinds of living matter in which it is an *amorphous germ*—that is, in which its external form depends merely on ordinary physical laws, and in which it possesses no internal structure." He termed the cell nucleus the "endoplast," and the cell wall the "periplast," which of necessity implies a vesicle with a "central particle." That there is no "evidence that any attraction or other influence is exercised by the one over the other," the changes which each subsequently undergoes though they are in harmony, having no casual connection with one another. "We have therefore maintained the broad doctrine established by Wolff, that the vital phenomena are not necessarily preceded by organization, nor are in any way the result or effect of formed parts, but that the faculty of manifesting them resides in the matter of which living bodies are composed, as such; or to use the language of the day, that the vital forces are molecular forces."

In J. Huges Bennett's (1855) "Practice of Medicine," he says: The ultimate parts of organization are not cells nor nuclei, but the minute molecule from which these are formed. They possess independent physical and vital properties which enable them to unite and arrange themselves so as to produce higher forms. Among these are nuclei, cells, fibres and membranes, all of which may be produced directly from molecules. Prof. Bennett believed in the spontaneous origin of animal life, which position he openly advocated.

In 1856 Todd and Bowman published the results of their researches, but the conclusions arrived at were in no essential features different from some of those previously given.

About two years later (1858) Virchow published his "Cellular Pathology." According to him the cell is the only possible starting-point for all biological doctrines. The cell can only originate from a previously existing cell, taking its primary origin from the ovum. The typical cell as described by him consists essentially of "cell wall," "cell contents" and "nucleus." The *nucleolus* he did not consider an essential constituent of the cell. The object of the "nucleus" he considered as entirely connected with the *life* of the cell, that which maintains it as an element, and from which other cells were produced. While to the cell contents, aside from the nucleus, is due the function of the cell, that to which is due the contility of muscle, the neurility and sensation of nerve, and the secretory offices of the gland cell.

Dujardin had, in 1835, discovered in the lower animals a living, moving, contractile substance which he called "*Sarcode*." The peculiar appearances of this substance attracted the attention of many observers. It was thought peculiar to the lower animals, and there was assigned to it a property of "irritability without nerves." The discovery which, however, followed, of similar movements and changes in form, in colorless blood-corpuscles, pigment cells and elsewhere, led Kölliker to express the conjecture that the contents of all cells are contractile.

In 1858, Max Schultze first showed the analogy between "Sarcode" and the contents of the animal cell, and that the entire infusorial world, simple or compound, is made up of cells, which he defined as "*protoplasm* surrounding a nucleus." "The cell leads in itself an independent life, of which the protoplasm is especially the seat, although to the nucleus also undoubtedly falls a most important though not yet precisely determined rôle. Protoplasm is for the most part no further distinct than that it will not commingle with the surrounding medium, and in the peculiarity that with the nucleus it forms a unit."

In April and May, 1861, Prof. Lionel S. Beale delivered the lectures before the Royal College of Physicians of London, in which he promulgated his views, which have since been more or less elaborated, and which have become associated with his name. The "cell" or "elementary part," as he prefers to call it, is composed of matter in two distinct states, viz., matter which is forming and matter which is formed; matter which has the power of growing by producing matter like itself out of pabulum or food, and matter which possesses no such power, but results from the death of the forming matter. The former is known as germinal or living matter, the latter as formed matter. The former in varying quantity in different cells, is central in its situation, and includes what has been called by other observers nucleus, cell contents, protoplasm, endoplast, etc. The latter, also present in different quantity in different cells, is peripheral, and includes what is known as cell wall, periplast, inter-cellular substance and products of secretion. He is of the opinion that the amœba, the mucus-pus and white blood-corpuscles are composed almost purely of "germinal matter." In its endowments and properties, germinal matter is acting, living, growing and moving, through some inherent power of its own. It alone, as he believes, is capable of producing material like itself out of pabulum, and of multiplying by division, or dropping off a portion of itself, which portion assumes an independent existence, and grows, maintains and reproduces itself like the parent germinal matter. This germinal matter is capable of being stained with an ammoniacal solution of carmine; the latest formed or central portion staining more deeply than that portion immediately surrounding it, and the further from the center of the mass, the lighter is the color, until the formed matter is reached, which takes no color at all.

It must be understood that what is called nucleus by Virchow and others does not constitute the whole of the germinal matter of Beale.

There may be other older germinal matter outside of the nucleus, on its way to conversion into formed material, but still possessed of life, and which assumes a tint with carmine, but not as deep as the nucleus, or center. Formed material, he says, instead of being active is passive, non-acting, dead, and can increase only at the expense and death of the germinal matter, on the periphery of which it is formed.

Beale, however, took the most active tissues of the animal body, to wit, the muscles and nerves, for formed material. This position was vigorously assailed by Bastian, who showed the weakness of Beale's theory upon the ground mentioned. The nucleus itself was shown by Brucke to be often missing, and by no means a constant part or portion of the cell. He also conceived the possibility of the granules being secondary products of the protoplasm, so much so that in his views the cell was a lump of protoplasm destitute of a distinct structure, and often lacking a nucleus. In this view he was followed by all German histologists, including S. Stricker, the editor of the Manual of Histology, the publication of which began in 1868, and was finished in 1871. Quite a discussion arose at that time among the savants as to the propriety of the term cell, and as to the necessary properties of a lump of protoplasm which would entitle it to the name of a cell.

New views as to the structure of protoplasm and tissues were announced by C. Heitzmann in 1873. This observer discovered a reticular structure in a number of protoplasmic lumps, both in isolated individuals, such as amœba, colorless blood-corpuscles, etc., and constituent parts of tissues, such as cartilage corpuscles, epithelia, etc. The reticular structure of so-called protoplasm seems to have been first noticed by Alexander Nasmyth in 1839, who gives illustrations of this reticulum, but no comment upon it. The reticulum in the nucleus was first seen by Frommann in 1866, and others after him, especially in corpuscles of the connective tissue of the nerve centers and in so-called ganglion cells of the spinal cord. Heitzmann claimed that the filaments visible in the nucleus, its inclosing shell, and the filaments in the mass of protoplasm, are formations of living matter proper, whereas the meshes of the reticulum, and the interstices between the filaments, are filled with a fluid non-living substance. He based his assertions upon the direct observation of the fact that during the motion of the protoplasmic lump the reticulum is in constant motion, and keeps changing its shape so long as the whole lump exhibits signs of life. Later observers, Strassburger, Butschli, Auerbach, Hertwig, Fleming, Klein, and a score of others, have demonstrated the presence of a filamentous structure in the nucleus, which is distinctly reticular only in the condition of rest. Most of these observers resorted to alcohol treatment, and staining methods which cleared up the bulky filaments of the nucleus only; hence a direct connection of the nuclear filaments with those of the protoplasm proper was rendered invisible and even denied. That much, however, was made clear by these researches, that in the nucleus there is a substance capable of form-changes, of growth and of division, properties, therefore, which we are accustomed to consider as attributes of life, or properly speaking, of living matter.

Beautiful, odd configurations of the filaments in the nuclei were described, especially in the process of its division; they present a star, or sun-rays-like appearance, and were given by Fleming the not very musical sounding name of "Karyokinesis." Heitzmann's assertion that the protoplasm likewise, at a certain stage of development, has a distinct reticular structure, is at present acknowledged as correct by many eminent histologists abroad, though the significance of this reticulum, and its participation in the process of motion and locomotion is still a much vexed question. According to these latest views the tissues of the body are not composed of single cells, and an intervening, intercellular substance, but all tissues form a continuous mass of living matter, which is arranged in the shape of a reticulum throughout the whole body. What formerly were thought to be individual and isolated cells, for instance cartilage corpuscles, bone corpuscles, etc., are, according to his views, points of intersection of the reticulum of living matter, the meshes of which contain a liquid in the so-called cells, and a comparatively solid glue-yielding basis-substance in the basis-substance between the cells. Epithelia also were shown to be connected into a continuous mass of living matter by means of the so-called "thorns" or "prickles" traversing the horny cement substance between the epithelia. The same uninterrupted connection of the living matter has been demonstrated in muscle and nerve tissue. All these tissues being supplied with, and accompanied by connective tissue, the carrier of blood and lymph vessels. They contain isolated corpuscles, called blood and lymph corpuscles, suspended in a liquid, the plasma of the blood and lymph.

This doctrine does away with the previous cellular views and "cellular pathology." Whereas in the former cellular doctrine the animal body was composed of a large number of individual cells, resembling a rather complicated mosaic, in the present view or views of Heitzmann, the body *in toto* is an individual, and the tissues nowhere contain isolated individuals except in the blood and lymph vessels. These views of Heitzmann have largely gained ground here in America, during the last nine years, while abroad many microscopists are rather loath in accepting a doctrine directly opposed to the cell theory. Among the most prominent microscopists in Europe who agree with these new views may be mentioned S. Stricker, of Vienna, and A. Spina, of Prague. The former demonstrated the life of the basis-substance in inflamed tissues, the latter in normal tissues of different descriptions by direct observation under the microscope.

L. Ranvier, of Paris, has recently succeeded in demonstrating the filamentous connections of the epithelia by means of new methods, to a degree of clearness which leaves no further doubt.

Thus I have traced out the development of biological doctrines from the ancient to our modern times.

The progress made in histology has been unquestionably connected with the development of our optical means, and so far as these means have reached a high degree of perfection, so the conclusions reached in the study of histology have become more perfect and satisfactory.

I am personally convinced of the correctness of the views announced and held by C. Heitzmann, of New York. The reticular connection I have shown in my publications on topics concerning the physiology and pathology of human teeth. Let us hope that with an advancing improvement of the optical apparatus and thorough education, this new doctrine will conquer; for with the cell theory neither the structure nor the pathology of the tissues could be explained to a full satisfaction.

Stricker himself has announced his conviction "that within the next ten years the new views are bound to replace the old-fashioned cell doctrine."

ORAL HYGIENE.

BY MEYER L. RHEIN, M. D., D. D. S., NEW YORK.

[Read before the First District Dental Society of State of New York, May 6, 1884.

This evening I propose to say a few words not concerning some new disease or remedy, but rather to illustrate and enforce that old adage, " an ounce of prevention is worth a pound of cure," in its application to ORAL HYGIENE, the subject to which I desire to call your attention.

The greatest difficulty is that we consider this a hackneyed subject, and feel that every one understands all about it. I grant you that we all have very fair views as to the manner of maintaining the sanitary relations of the component parts of the oral cavity, but do the public at large understand any of the principles of oral hygiene? Aye, I may even ask how many of our patients have well defined ideas as to how the healthy condition of their mouth is to be maintained. Those few who have any knowledge on this subject are only notable examples of exceptions to the rule.

This subject, commonly considered so simple as to deserve only a passing notice, assumes, in my eyes, a position of vital importance; and the frequency with which it has been considered in other societies during the past year indicates that we are at least awakening to the value of prophylaxis in our department of medicine, with the full hope and expectation of avoiding many dreaded diseased conditions.

ORAL HYGIENE may be summed up in one word, *cleanliness.* Keep the mouth in a perfectly clean condition, and the number of those terrible diseases would decrease; maintain the normal condition of the secretions, and the number would be still further reduced. How much rarer the cases of pyorrhœa alveolaris and pericementitis we would meet if people would keep their teeth as clean as their faces! How rare would be the cases of exposed pulp if food was never permitted to ferment between the teeth! I shall not, however, consume time by repeating all the evils that can be either prevented or at least alleviated by this seemingly simple prescription. To keep the teeth clean sounds like such a simple thing that it often deceives doctors as well as patients.

When we consider the close juxtaposition of the teeth to each other, ofttimes the irregular position they assume in the arch and, most important of all, the frequency of taking food or other articles into the mouth which may become lodged around the teeth, and the resulting fermentation proceeding upon its work of destruction—then we see that the rule is not so *very* easy to follow, and sooner or later the patient must have his prescription amended, to read, *Keep your teeth as clean as possible.*

It is our duty, then, to take some of our valuable time and show people by careful manipulation, how very little they know about this sanitary measure. How many of us do this, and if we do it for some patients, why do we not the same duty for all who intrust themselves to our care? Too often, in the hurry and strife of our daily life, do we neglect this all-important duty. The principal article necessary, and the one for which we have not yet discovered a substitute, is the tooth brush.

At a discussion of this subject before the Odontological Society last October, one of the members said (*Dental Cosmos*): "Everybody knows more or less about brushing the teeth; every person understands it; it is an established thing, like washing your face and brushing your hair." My experience, and it has been substantiated by that of much older men, is, that however established may be the practice, everybody knows *less* about brushing the teeth correctly and *more* about brushing them improperly.

Upon making a careful and extensive examination of the brushes retailed in the largest stores in New York city, a feeling of dismay came over me at the ignorance displayed by the general public in their choice of this most necessary adjunct to the paraphernalia of the toilet. Wherever I asked which was the most popular brush, I was shown brushes of such huge dimensions that, before they were shown to me, I supposed they were intended for cleaning the hands and nails. Some of you may doubt this, but you only have to go, ascertain and be convinced. One of this class of brushes is "Dr.

Scott's Electric Tooth Brush," the dimensions of which are simply immense. The cross motion is the only one that can be made with a brush of such magnitude. To quote from Dr. Abbott on this subject: "The consequence is, the gums are irritated and recede, the necks of the teeth become cut or grooved, and sometimes even the enamel is brushed off; besides, when the brush gets half way back in the mouth, its excessive size prevents it from going further, and the back molars are not touched at all."

So the first thing necessary is to prescribe a *suitable* brush for your patient. Concerning this, I will speak later; but supposing we have the proper brush, it should be passed in every direction across the grinding surfaces or crowns of the teeth to insure the bristles reaching every depressed surface or fissure, and upon the inside and outside of the arches, passing it in the direction of the length of the teeth from the gum toward their cutting edges, by slightly turning the hand upon the wrist so as to cause the brush to move from *side to side*. The necessity of brushing behind the wisdom teeth and the insides of all the teeth should be given careful attention. The brushing should never be severe, but always a delicate operation—to merely remove the effete material of a few hours' standing. The dentifrice used should be of the finest quality, so as to produce the least possible amount of friction. The time to brush the teeth is after every meal and before retiring, so as to always leave a clean and polished surface, with no opportunity for fermentation to be instituted in food entrapped between or around the teeth during each meal.

To remove what remains between the teeth after the brushing, nothing surpasses the waxed dental floss, and occasionally a little powder can be carried on it between the teeth. If these directions are followed out to the letter, the patient is keeping himself from many hours of dental torment under our hands.

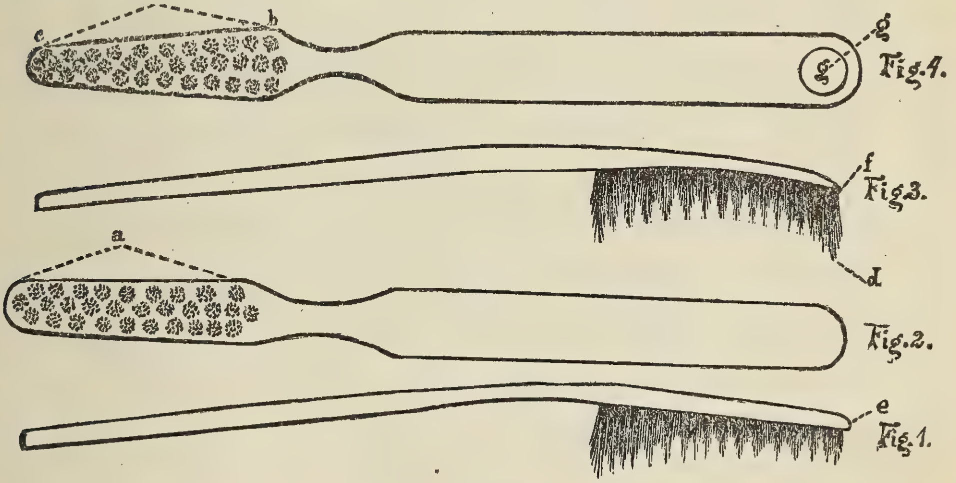
Of course, there are a large number of patients, business men more especially, who will not follow our instructions very closely. My motto in such cases is, "A half loaf is better than none." If they will not cleanse them after the noon meal, why, insist on their attention to this matter subsequent to breakfast and the evening meal. Nothing is more instructive to the patient than for the dentist, having first handed him a hand-mirror, to carefully brush the patient's teeth for him, explaining at each change of position the method and direction in which the force is applied.

One of the most difficult things of accomplishment for the human race is the formation either of a new habit or the breaking of an old one. It is for this reason that the inculcation on the mind of a child of this practice of cleanliness cannot be commenced too early. As soon as their first teeth appear, make the cleansing thereof part of their regularly recurring duties. They will soon grow to like it, and will be proportionately uncomfortable until it has received attention; and thus, when the child is still very young, a habit of the greatest benefit is being formed—one which will grow firmer as the child grows older, and prove a boon and blessing to them in later life.

For a long time I sought in vain for a tooth brush that came up to my ideas on this subject. In turn, I discarded the Windsor and Palmer brushes. About this time, Dr. T. J. Thomas, of Paris, presented me with a few of the style of brushes he had been using. They suited me better than any I had yet met, and I concluded that, with certain modifications and improvements, it could be transformed into *the model tooth brush.* In setting out to improve the brush, three facts were impressed upon me:

First, A brush that would reach every exposed portion of the teeth, in small mouths as well as large ones.

Second, One that would accomplish its work as automatically as possible.



Figs. 1 and 2. Brush received from Dr. T. J. Thomas.
Figs. 3 and 4. The Prophylactic Tooth Brush.

Third, If possible, construct the brush so as to prevent the patient's passing it across the teeth.

The brush that has been evolved from these three principles I have named The Prophylactic Tooth Brush. (Figs. 3 and 4.) The slab of bone is curved, with the bristles on the concave side. On the brush, as presented by Dr. Thomas (Figs. 1 and 2), the bristles were divided into three rows, running in parallel lines to the end of the brush. They are widely separated and trimmed to different lengths, to pass as far as practicable between the teeth. The bristles were very high next to the handle and gradually decreased in size, until at the end they were very short. The head of the brush was one-half inch wide at any point (Fig. 2, a). My first step was to give the brush a decided taper, so that while the bone next to the handle was one-half inch wide (Fig. 4, b), at the apex it was less than one-fourth inch in width (Fig. 4, c), and the bristles at the apex are not more than one-eighth inch wide (Fig. 3, d.) The next step was to change the concavity of the bristles. Instead of having them very short at the apex, after passing the center of the brush, the bristles commence to rise in height, and at the apex there are three converging rows of bristles forming one narrow tuft (Fig. 3, d). The trimming and separation of the bristles were left the same.

On the original lot of brushes, and on every brush that I have ever seen, the bristles are set back some distance from the end of the brush, leaving a projecting piece of bone from one-sixteenth to one-eighth inch in length (Fig. 1, e). In a great many mouths this portion of bone prevents the proper brushing of the wisdom teeth, as in attempting to cleanse them it is poked into the soft parts of the mouth. In my brush, this protruding portion of bone terminates close to the bristles (Fig. 3, f), the apex at the back being beveled off, so that the brush passes with the greatest ease around all portions of the wisdom teeth, even in the smallest mouths.

Another improvement in the brush consists in an aperture near the end of the handle large enough to pass over an ordinary tack (Fig. 4, g). The idea of drilling a small hole in the handle of a brush and passing a string through it was one I received from Dr. F. M. Odell some years ago, but the enlarging of the aperture so as to do away with the string is a considerable improvement. The advantages to be derived from hanging up a brush after using, are a more speedy drying of the bristles and additional ventilation, and consequently the brush remains much sweeter and cleaner than by a number of other methods.

Each brush comes enclosed in an envelope, upon which are printed directions for the intelligent use thereof, and the following caution: "Never pass the brush ACROSS the teeth, as this movement destroys the delicate membrane which attaches the gum to the teeth, causing recession of the gum, and ultimate loosening and loss of the teeth."

The brush has been used by a number of our best known dentists in New York, Philadelphia, Chicago and Boston during the past few weeks, and it has received the heartiest endorsement of all of them.

Having reached the conclusion that THE PROPHYLACTIC TOOTH BRUSH comes nearer to the general approval of the profession than any other brush, I determined to present the brush to the general public through the regular channels of trade, not as Dr. Rhein's brush, but merely as THE PROPHYLACTIC TOOTH BRUSH. For some time the question of professional dignity harassed me, and I was averse to entering into any commercial relations; but a careful consideration of the premises showed me that the fact of my presenting this article to the public need bear no relations to my professional calling. Public hygiene has been a factor of discussion in every medical society, and for the same reason I deem the subject of *dental hygiene* as relating to the *general public* a fit subject for us to consider. Any efforts that we make for improving the general sanitary condition of mouths, and for instilling some useful knowledge on this subject will certainly tend to nothing less than the elevation of our professional standing.

A HISTORY OF DENTISTRY.

BY GEORGE H. PERINE, D. D. S., NEW YORK.

[Continued from page 216.]

It is estimated that in 1830 the number of dentists in the United States had increased to about 300, and the advancement in every department of the specialty was marked. The number and utility of instruments were much augmented, and changes for the better were constantly being made in general practice. The importance of diffusing information to the people regarding the care of their teeth was at length realized, and consequently the number of popular professional treatises multiplied rapidly. Physicians began to decline undertaking dental operations, referring patients to those making dentistry a specialty. The establishment of tutorships and dental chairs in medical colleges became a subject which engaged the attention of many leading practitioners. Dr. Gardette was a strong advocate of this movement, in which he was seconded by Drs. Hayden, Hudson, Trenor and others, the former having delivered lectures on dental surgery in the University of Maryland, and the latter having exerted himself to induce the faculty of colleges throughout the country to create dental professorships. Dr. John Harris, in 1835, 1836, delivered a course of dental lectures before the medical department of the Transylvania University of Kentucky; and about 1845 Dr. John S. Clark delivered a course of lectures on dentistry in the St. Louis Medical college, and a few years later Dr. B. Wood received an appointment to the dental tutorship in the University of Tennessee. In 1851, 1852, Dr. C. C. Allen, of New York, who was greatly in favor of the appointment of dental chairs in medical colleges, delivered a course of lectures in the New York Medical College. There were many members of the medical profession who were disinclined to view dental surgery in any other light than an important branch of the healing art, while others, and the number was by no means small, insisted that it constituted a distinct profession in itself, and the establishment, in 1839, of "The American Journal of Dental Science," the first publication ever devoted to and dealing solely with the interests of the dental specialty, and in the procuring, the same year, of a charter for the establishment of, in Baltimore, the first dental college in the world, brought all controversy upon the subject for a time to a close; for from that date dentistry was by the majority considered a distinct profession, while by some it still continued to be regarded as a wayward and wilful child who, by its own heedless act, had severed all connection from the mother whose offspring it undeniably is. Since the year 1839 there have been published in the United States 44 dental journals, and at the present time there are in existence 21, distributed as follows: In the State of New York, four; Pennsylvania, three; Illinois, two; Georgia, two; Ohio, two; and in Massachusetts, Indiana, Missouri, Tennessee, Delaware, California, Wisconsin and Texas, one respectively. To the thoughtful reader, the benefit which these numerous publications bestow upon the dental specialty must be unmistakable. Diffusing as they do the results of manifold experiments, and the fruits of professional study and labor, their presence in operating room and laboratory becomes almost, if not absolutely, imperative; and it is but just that every worker and experimenter should make known, through contributions to their pages, the results attending his labors, that the work of improvement which has brought the science to a state of comparative perfection may continue. To the dental societies which have been organized in this country much credit is due for many improvements, and the increase of advanced ideas; indeed, it would be almost an impossibility for us to estimate the value of their labors. In the year 1841, the first dental society ever organized in the world was founded in New York, and was known as "The American Society of Dental Surgeons." "The American Journal of Dental Science" soon became the property of this organization, when its name was changed to the "American Journal and Library of Dental Science."

The next society which came into existence was "The Virginia Society of Surgeon Dentists," which was organized in 1842. In 1845, it obtained its charter; hence, it claims our respect as being the first regularly incorporated dental society in the world.

Between the years 1842 and 1884 there has been organized in the United States one hundred and three dental societies, and in Canada two; and a large number of these associations are still in existence, and doing much toward the advancement of science, and several of them have been regularly incorporated. Since the founding of the Baltimore College of Dental Surgery, to which we have alluded, other dental colleges have come into existence and been regularly chartered. They were as follows: In Kentucky, one; Ohio, one; New York, two; Pennsylvania, three; Missouri, two; Louisiana, one; Massachusetts, two; Indiana, one; Illinois, one; and California, one. A dental department has been connected with Harvard College, the University of Michigan, the Pennsylvania University, the University of Tennessee, the Vanderbilt University, and the University of California. A dental surgeon was in 1862 appointed to Girard College in Philadelphia; and, in addition to the above, the following institutions have established dental tutorships: The Iowa State University; the Kansas City Medical College; the Rush Medical College, Chicago; the Albany Medical College, and the Syracuse Medical College.

The first dental infirmary in the United States was established by the Society of Dental Surgery of the State of New York, in 1847. This infirmary was open each Saturday for clinical operations, which were made for the benefit of the inmates of charitable institutions and other worthy indigent persons. Members of the State Society and their students were entitled to all the benefits of practice and observation the institution afforded.

In 1861, a dental hospital was connected with the Charity Hospital of Philadelphia, this being the first hospital of the character founded in this country.

In 1867, the Brooklyn Dental Infirmary was established under the auspices of the Brooklyn Dental Society, and was voted by the city an annuity of $1,500.

The Massachusetts General Hospital, in 1872, established the office of "Dentist of the Hospital." So great has been the demand upon the dental department of this institution that several thousand patients are treated there annually. Notwithstanding that the advance in dental science in this company has been rapid, there has not been on the part of the faculty, it would appear, a sufficient interest taken in hospital service. In other words, the improvement in hospital attendance has not kept pace with those made in other directions, else the medical and surgical staff of all hospitals in large cities would include a competent dental practitioner by whom patients suffering from diseases of the oral cavity would be placed.

St. Luke's, the Woman's, the German and Manhattan Hospitals, the Columbia Institute of New York have each a dentist included in their medical staff.

From the foregoing, the reader will be enabled to form a fair idea of the advance made by the specialty within a comparatively brief period. A step of great importance, and by which the specialty considerably elevated from its previous standard, was the enactment in most of the States of a law to insure the better education of the practitioners of dental surgery, and to regulate the general practice of the specialty. The State of Alabama was the first to set a worthy example by the passage, in 1841, of a Dental Act, which was followed by New York, Ohio, Indiana, Kentucky, Louisiana, Georgia, North Carolina, South Carolina, West Virginia, Pennsylvania, New Hampshire, New Jersey, Illinois, and California; and it is likely that ere long every State in the Union will take legislative steps to regulate the practice of dentistry. Canada has also passed an Act regulating the practice of the specialty in the Provinces. In the States of New York and Georgia dental practitioners are by law exempt from jury duty. The result of such legislation as we have alluded to must be obvious to the reader. Irregular practitioners were in a great measure restrained, and those entering the profession are compelled to acquaint themselves thoroughly with all of its branches and requirements.

A subject which has been more or less agitated since 1840, or thereabout, and one which is intended to benefit a vast number of persons in the service of our government, is the question of dental appointments in the army and navy. In 1859, through the efforts of Dr. E. Maynard and others, the President and Cabinet became so much interested in the subject that there was at one time every appearance of the matter assuming a substantial issue. The secretaries of war and of the navy also viewed the subject favorably but, owing doubtless to the pressure of other business, no official action was taken.

In 1861, the American Dental Convention appointed a committee to bring the subject again forward. The Surgeon General was conferred with, and by him the matter was recommended in his report, but it was not until 1868 that a bill was drafted, recommending the appointment of dentists in the army and navy, which was presented before Congress, by which body it was referred to the committee on military and naval affairs, by whom no action was, however, taken.

Again, in 1874, a second bill was brought before the House, advocating dental appointments, which was also referred to the committee, as before, who failed, however, to bestow upon it the attention one of such importance deserved. A dentist has been appointed to the United States Naval Academy with the rank of assistant surgeon.

During the progress of the late unhappy war, there arose in the Southern States a discussion as to whether dentists were, as physicians, exempted from the army, when it was decided that they were subject to conscription. Surgeon-General Moore immediately made application to the Bureau of Conscription for the detail of dentists for duty in the hospitals, and, after some months of experiment, he caused to be issued the following order:

OFFICE OF THE MEDICAL DIRECTOR C. S. HOSPITAL IN VIRGINIA.
Richmond, Va., Nov. 4, 1864.

CIRCULAR NO. 15.

I. As far as practicable in future, the operations of dentistry required in General Hospitals in Virginia, will be performed by Officers, Soldiers, or Conscripts assigned to those duties, who are dentists by profession.

II. Examinations will be made, at such times as may be fixed by the surgeon in charge, of each officer and soldier, admitted into hospitals, and the necessary operations performed with the concurrence of the attending Medical Officer.

III. Dentists are expected to be provided with their own instruments, but the necessary materials and files will be purchased with the Hospital funds, and requisition made for other instruments thought necessary.

IV. Dentists will have the rank, pay and perquisites to which their position in the army entitles them, and, in addition, such extra duty pay for extraordinary skill and industry, as the Surgeon-General will allow, in accordance with general order No. 66 A. & I. G. office, current series.

V. Monthly reports of dental operations and accompanying registers, in accordance with forms furnished, will be forwarded through the Surgeon in charge, and through this officer to the Surgeon-General by the fifth of the month succeeding.

(Signed.) Wm. A. Carrington,
Medical Director of Gen. Hospitals in Virginia.

War Department, Surgeon General's Office,
Richmond, February 6, 1865.

To Medical Directors of Hospitals:

I. Medical Directors of Hospitals will without delay, select a thoroughly lighted ward (gas-lighted if practicable) in some one of the Hospitals under their jurisdiction, to which will be sent for treatment, by Bean's apparatus, all cases of fracture of the superior and inferior maxillary bones now in Hospital, or that may hereafter be admitted.

II. In the construction, adjustment and use of this apparatus the attending Surgeon will be aided by the Dentist assigned as such to the Hospital selected.

Any article, not on the Supply Table, necessary for the treatment of such cases may be purchased by the Hospital fund.

The ward selected being reported to this office, the inventor will visit the Hospital to confer with the authorities on the preparation, adjustment and use of the apparatus.

Medical Examining Boards will not grant furloughs in such cases until the fractures are completely united.

SAMUEL PRESTON MOORE,
Surgeon-General C. S. A.

Official: S. H. Stout, Medical Director.

Under another order from the Surgeon-General's Department Dental Surgeons were required to make monthly reports to the Medical Director, and separately for each Hospital, the number and character of each surgical operation performed during the month.

CORRESPONDENCE.

Editor New England Journal of Dentistry:

Herewith I hand you copy Constitution and By-Laws of the Dentists' Benevolent Association; also report of last annual meeting, held at Sweet Springs, Mo., July 10, 1884. This Association, as you are aware, was first organized under the name of "The Dentists' Mutual Benefit Association," but for several reasons the name was subsequently changed to that which it now bears. The projectors have made no decided efforts heretofore to bring it to the general notice of the profession, preferring to wait until such time as they felt it was on a basis sufficiently sound and reliable to insure future success. This they are now quite sure has been accomplished, and with that feeling they wish, through the medium of the dental journals, to present its claims to those most directly interested, and ask at their hands the recognition and encouragement its objects entitle it to. It had its origin through a discussion of "The Marshall H. Webb Fund," and those most active in its inauguration were prompted by no motive other than the formation of systematic plans to meet the requirements in similar cases in such a manner that the burdens of contribution would be more equally distributed, and the families of such men aided in a way that would not leave them in the light of mendicants. After a thorough canvass of several different plans, those which they now present were deemed the most feasible, for the time being, at least. If in the future its membership should be so aggregated as to give it proportions of more general and widespread interest, then such changes and improvements as seem indicated can be made. It is duly authorized by charter to carry out the objects of its organization, and its officers and members are thus far all responsible and well-known men, and we trust that their names are a sufficient guarantee of its reliability. Thus far the few of us who have been most active in the movement have given our time and money without hope of fee or reward other than the satisfaction of having laid the foundation for good to our fellow man and dentist. This we expect to continue in the future until such time as the duties become such as to demand remuneration for their perfect performance. By this means, its operation is rendered comparatively inexpensive, a feature which gives it advantages superior to that of any similar organization in existence. If not inconsistent with your views, we would ask that you give accompanying report space in your JOURNAL, together with such editorial mention and endorsement as you feel justified in giving.

Respectfully,

R. I. PEARSON, *Secretary.*

DENTISTS' BENEVOLENT ASSOCIATION.

The first annual meeting of the above organization was held at Sweet Springs, Mo., July 10, 1884, President C. H. Darby in the chair. About twenty-five members were in attendance.

The annual report of the Secretary and Treasurer received and approved.

The following officers were elected for the ensuing year:

President—Dr. C. H. Darby, St. Joseph, Mo.

Vice-Presidents—Drs. F. Swap, Booneville, Mo; Dr. J. J. R. Patrick, Belleville, Ill.; W. H. Eames, St. Louis, Mo.; R. E. Nickles, Salina, Kan.; J. W. Reed, Battle City, Montana Ty.; Mr. F. X. Combs, Chicago, Ill.

Secretary and Treasurer—Dr. R. I. Pearson, Kansas City, Mo.

Board of Directors—Drs. A. H. Thompson, Topeka, Kan.; J. A. Price, Weston, Mo.; J. M. Austin, St. Joseph, Mo.; George H. Cushing, Chicago, Ill.; G. W. Tindall, C. B. Hewitt, J. B. Patterson, H. S. Thompson, A. C. Schell, J. S. Letord, Kansas City.

This Association is now in practical working order and is duly authorized by charter from the State of Missouri to carry out the objects of its organization. Composed exclusively of persons identified with the dental profession, and having no salaried officers or other excessive expenses, it offers to those eligible to its benefits a cheap and reliable means of providing for their families in case of death. For further information, address

R. I. PEARSON, *Secretary,*
2206 Troost Ave., Kansas City, Mo.

Sept. 1, 1884.

We have heretofore referred to the above Association, and commended it to the notice and encouragement of the profession. The "ball is now in motion," and there is ample material in America for a large and prosperous association of this kind among dentists. Let all who are interested write to the Secretary for a copy of the Constitution and By-laws. We are satisfied that it is an association worthy of support and for the interest of the profession.—[ED.

OUR NEW YORK LETTER.

All dentists will be interested to learn of the important decision rendered Sept. 17, in the New York Circuit Court, concerning the so-called Richmond patents.

The "International Tooth Crown Co." applied for an injunction restraining Berkowitz and Muller from using the methods covered by the C. M. Richmond "Tooth Crown," the Low "bridge" patent, and the A. S. Richmond "bridge" patent.

The defendants were formerly students in the office of the "International Co.," and when they began private practice purchased one year licenses of the Company to use the methods in question. These licenses having expired, the Company for some reason refused to renew them and prayed the Court for an injunction when learning that Berkowitz and Muller were still crowning roots.

The importance of these proceedings to the profession was very great, as in one sense they constituted a test case and made every dentist in the United States a defendant. Fortunately, the profession was alive to the danger, and turned out in force to oppose the application, represented by that celebrated patent lawyer, Mr. S. J. Gordon. Fortunately, too, the case came before Judge Wallace, who recently decided that patents proved to have been procured by fraudulent representations could be invalidated under the new national law which relates to the forfeiture of land grants obtained through fraud.

The testimony of Dr. A. S. Richmond concerning the fraudulent representations used in procuring the patents, and the expert testimony of Drs. Dwinelle, Northrop and Kingsley, upon the extent of the dental art and the almost universal use of the principles in question for years before the patents were issued, caused Judge Wallace to refuse the injunction and to invalidate the C. M. Richmond "tooth crown" patent, and the Low "bridge" patent—which bridges from an attachment to *one* root by the use of a Richmond Crown or Cap.

Decision was reserved concerning the A. S. Richmond "bridge" patent, which covers the process of attaching porcelain teeth to a bridge fastened to *two* roots by the use of Richmond Crowns, one at each end of the bridge.

A desperate attempt is to be made by the "International Co." to sustain this patent, for it is the only one of any consequence left them, and any dentist who used the method before August, 1882, can materially aid in having the patent set aside by sending his address to S. J. Gordon, Esq., 44 East Fourteenth St., New York city.

One clause in the licenses signed by the defendants, Berkowitz and Muller, stipulated that they should never contest the validity of the patents or engage in any suit concerning them against the "International Co.," even if that Company should refuse at any time to renew the licenses. Therefore, the plaintiffs claimed that this clause in the licenses debarred the defendants from defending themselves against the desired injunction, and Judge Wallace reserved his decision upon this question, intimating, however, that he would not enjoin parties under patents which he had invalidated because of proof concerning their fraudulent creation.

The profession certainly owes much to its "Protective Association,"—at the head of which is that war-horse in every good cause, Dr. W. H. Dwinelle—for the thoroughness of their work in this matter; and enough in praise cannot be said concerning the kind and patient interest taken in the case by Mr. Gordon, who has given it the benefit of his skill and great legal experience, and as yet without the deserved remuneration.

Those who attended the March meeting of the First District Dental Society will remember the interesting statement made there by Mr. Gordon in regard to these patents, and what he thought could be done if the dentists should try to have them invalidated. He has now fulfilled his prophesy!

D.

BOOKS AND PAMPHLETS.

FORMATION OF POISONS BY MICRO-ORGANISMS: A Biological Study of the Germ Theory of Disease. By G. V. Black, M. D., D. D. S. P. Blakiston, Son & Co., 1012 Walnut Street., Philadelphia. Price, $1.50.

A volume of about 180 pages, faultlessly printed and bound, supplying a want that has, for some time, been apparent. It consists of a series of lectures, "delivered before the students of the Chicago College of Dental Surgery and a number of practitioners who were ticketed especially for this course."

The first three lectures—part first—give a brief *historical* study of the Germ theory of disease, divided under the following heads, namely: *Introduction—First Traces—Incentives to the Study—First Definite Announcement—Phlogiston—Zymosis—Jenner—Nineteenth Century—Early Discoveries—Schwan—Effects of Schwan's Discoveries—Liebig's Opposition—Difficulties—Schroeder—Pasteur—Bastian—Logical Sequence—Difficulties—Modes of Propagation—Utilizing Discoveries—Explanatory—Nature of the Evidence—Direct Examination—Hirschfield—Evidence Unsatisfactory—Nature of Miasm and Contagion—Miasmatic Contagion—Infection Experiments—Thiersch—Lister—Dr. Salman—Billroth—Virchow—Prof. Klebs, of Prague—Volkman—Lister's Reply—Beale—Bacillus Anthrax—Koch—Results—The Evidence—Spores,–Habits—Summing up.*

The subject of the four following lectures—part second—is: "The Relation of Micro-Organisms to the Production of Disease," under the following headings, *Necessity for a Physiological Study of the Subject—Digestion—Propositions—Ferments—Plants—Sprouting of Seeds—Nutrition—Yeast Plant—Cellular Digestion in the Higher Animals—Resorptive Digestion—Digestion of Blood Clot—Digestion of Ligatures—Digestion of Sponge—Necrosed Bone—Action of Tissues—Soluble Ferments—Pathological Formation of Ferments—Parasites—Waste Products, considered with Reference to the Germ Theory of Disease—Waste Products of Plants—Alkaloids—Bacteria—Tabulated Statement of the Waste Products of Various Organisms—Poisons—Farther Investigation Needed—Physiological Changes—Manner of Action—Inflammations and Blood Diseases.*

Then follows an Appendix on "*Dental Caries: Its Relations to the Germ Theory of Disease.*"

The above, together with Dr. Black's well known ability to deal with such subjects, is sufficient to excite a general interest in, and a demand for, the book.

The portions of this work that seem to us of *chief* interest at the present time is indicated by the following quotation. After reviewing the *history* of the Germ theory—which is concise and of much value to the ordinary reader—the author says: "It will be seen by any one who reviews this whole subject closely that, while the experimentation that has been had furnishes the strongest evidence that disease results from the presence of micro organisms (is brought about in some way through the life and growth of these lowly forms), the *modus operandi* by which they induce disease has not been explained, or such explanation has been but partial." . . . . The Germ theory of disease, as it stands to-day, is essentially a mass of unexplained facts, developed by direct experiment of the most subtle nature; so subtle, indeed, that there are but few men who have the natural endowments and rigid training necessary to verify them in a manner, and with the certainty, that the thought of the times demands.

Under these circumstances, and with the plain fact before us that the mere presence of the organisms is not a sufficient cause of the diseases that experiment teaches us are induced by them, we naturally turn to the well demonstrated fact that micro-organisms do give rise to poisons, for an explanation of these phenomena. It is our purpose now to make an effort to trace certain of the phenomena presented by the life force in its relations to matter, with the end in view of elucidating this difficult point. In this direction, as it seems to me, we are most likely to find a satisfactory explanation for some of the teachings of experiment that have seemed difficult to understand."

No one who is at all conversant with the present standing of the Germ Theory of Disease can fail to be deeply interested in the question; of: "How can these low organisms produce disease"? What is the modus operandi by which they produce the results growing out of their presence and activity? So far investigators throw but little light on these questions. The answer will probably have to be given by others than those who are giving us the facts discovered along the line of their special investigations. Dr. Black, at least, gives us much to think of in relation to an answer to these questions. That he has found the true answer, that his theories will not be modified, it is hardly reasonable to expect; but that he has "opened up the right vein" seems perfectly clear. At the risk of misleading, but for the purpose of exciting an interest in the Doctor's full explanation, we quote the following: "To say that these organisms produce disease, simply by their presence, is not a sufficient explanation. We all know that their presence is not, in itself, a sufficient cause; for if this were so, one organism would be as potent as another. And we all know, who have had any experience in the examination of these forms, that many of them are without any evil effect whatever; that wounds in the mouth and elsewhere heal readily and perfectly when covered with them. We also know that a great majority of the higher plants are innocent of any evil effect upon the human system; and it is perfectly reasonable that we should find the same differences to exist among the lower plants. Many kinds of plants grow together without injury to each other; but plants are found that destroy their neighbors by the poisonous effects of their waste products. Then it seems plain that the differences must be found in the peculiar products to which the peculiar organism gives rise. These we have already sufficiently explained. We have, also, sufficiently explained the modus operandi, in the destruction of organic substances in general. They are simply remoleculized, as any other food material is remoleculized; nothing more and nothing less; and it is in the chemical reorganization of the elements for the formation of the waste products that poisons are evolved.

It seems perfectly natural that in this remoleculization there should often be a residue that escapes digestion; as is seen in the so-called rotting of wood and many other substances. It is not probable that one organism is capable of the complete destruction of such substances; but rather, that many are concerned in the work."

Dr. Black's "remoleculization" appears to be a term substantially equivalent to Pasteur's "disturbance of the normal equilibrium of the tissues;" perhaps, rather, an elaboration of the latter.

In regard to the resistance of tissues to the invasion of organisms Dr. Black thus happily illustrates: "How do they (the tissues) resist? Now, if we accept the explanation of the formation of the digestive bodies, as previously explained, this supposition becomes tenable. When an organism or spore of an organism falls upon a cell or naked granulation of a wound, and finds there the conditions suitable for its development, its digestive body is at once thrown out for the preparation of its food material which exists in the tissues with which it is surrounded. This digestive substance proves irritant to the cell upon which the germ has fallen. This irritation excites the cell to throw out its peculiar digestive body for the removal of the irritant with which it is beset. Here we get a glimpse of the antagonists. It is cell against cell; digestive body against digestive body. A contest has begun. Which will win? The stronger, of course. If the man be vigorous and healthy and his tissues highly endowed with the energies of life, the chances are this much in his favor; but if, on the other hand, his powers of life be at a low ebb, if his tissues respond to the irritants but feebly, then the chances are, this far, in the favor of the intruding organism. . . . . Surely, if the tissues are capable of forming, by reason of irritation, a secretion that will digest a piece of ivory that has been thrust into the flesh, which has been proven by direct experiment, we should expect this kind of resistance to be offered to the development of disease-producing germs." We might go on quoting at very great length did our space admit, for the book is full of good things, but our purpose was simply to indicate, to some extent, the line of thought of this extremely interesting and instructive little treatise on an extremely interesting subject.

Of Dr. Black's treatment of the Germ Theory as related to dental caries we have the space to but briefly notice. He, in a condensed form, reviews the history of the various theories heretofore held, giving prominence to the acid theory, and showing how "the old acid theory glides easily into the new germ theory." Here he ingeniously introduces the theory of soluble ferments or organic digestive fluids, depending upon neither acidity or alkalinity for their action. His accounting for the "widening of the tubules" is of special interest at the present state of discussion. Dr. Miller seems to account for this phenomena by the simple action of lactic acids, derived from the fermentation of the starch and sugar of food substances and the saliva: an *outside* source. Dr. Black states that the "widening of the tubules is a conceded fact. It is also shown that it is not done by the lactic acid in cases of other experiments; nor can it be done by the physical force of the organisms; but it can, in all probability, be done by the digestive fluid of the organism. The conditions for this work of the digestive fluids is the same as that of the granulations in widening the meshes of the sponge and finally removing the last of it." Dr. Black's position in regard to the action of micro-organisms in dental caries is—it would seem—more in accord with Underwood's theory than that of Miller's. The digestive fluid, or toxic secretions, of the organisms serves to break down the *molecular structure* of the vital *contents* of the tubules first, and afterwards acting upon the *walls* of the tubules, thus widening and enlarging them as is shown to be the fact. Thus the *effect* of the action of organisms may, theoretically at least, be observable in advance of their actual presence. If Dr. Black is correct in this, Dr. Miller's mistake in accounting for his "softened but non-infected territory" may be readily understood. His lactic acid and its origin relates mainly to the "scab" of the sore; the digestive fluids of the organisms produce the sore.

We have been intensely interested in the perusal of this little book because of its recognition and elucidation of the universal law of molecular transformation, or molecular rearrangement. It deserves, and doubtless will have, a wide reading on the part of the profession.

The paltry sum of $1.50 should be considered a small equivalent to offset the information which may be gained by a knowledge of its contents. S.

TRANSACTIONS OF THE ILLINOIS STATE DENTAL SOCIETY FOR 1884.

We always look with eager interest for the annual transactions of this society, and this is in no way disappointing. It is a volume of 170 pages, neatly printed and bound, and, apparently, very faithfully edited. Several of the papers are illustrated by excellent wood cuts. A hasty glance would indicate that the leading papers of general interest were "Reflex Pain," by Kate C. Moody, D. D. S.; "Origin of Defective Enamel," by W. H. Eames, D. D. S.; "Inflammation," by Homer Judd, M. D.; "Dento-Embryonal Histology," by W. X. Sudduth, D. D. S., finely illustrated; "Irregularities in Human Teeth; or, Dental Teratology," by John J. R. Patrick, D. D. S., also profusely illustrated, and "Chemistry," by Wm. H. Taggart, D. D. S.

The discussion following these papers is, generally, excellent, and indicates—what seems to us an excellent plan—that by previous arrangement some one was appointed to *open* the discussion on each paper. Thus, in many instances, virtually two papers were produced on the same subject.

The "Transactions" of this society are very nearly a model and type of what any society may well aspire to reach.

TRANSACTIONS OF THE DENTAL SOCIETY OF THE STATE OF NEW YORK. Sixteenth Annual Meeting, 1884. Committee of Publication: Drs. J. Edw. Line, F. French and W. C. Barrett.

In our June number we alluded to the annual meeting of this society, which was held May 14, 15. The "Transactions" make a very neat volume of over 100 pages, very carefully edited, and in every respect a credit to the society and the profession as well. The committee of publication are to be congratulated upon having so soon completed their work. Unless these reports come somewhere within a reasonable time of the occurrence of the meeting, they lose much of the interest that would otherwise be attached to them.

It is a pity that the "Transactions" of several of these State societies cannot have a wider circulation among the profession. They make excellent material for every dentist to study and file away in his library for future reference.

The VIERTELJAHRESCHRIFT DES VEREINS DEUTSCHER ZAHNKÜNSTLER of August contains a report of the general meeting. This society is quite prosperous, having a surplus of about $300.

The Germans use the French word plombe for cement, which appears to us as very much inferior to the English word.

A new remedy supposed to be superior to ordinary arsenic for killing pulps is proposed, namely, fly poison or fly cobalt, a combination of arsenic and cobalt. We cannot see, a priori, any advantage of a preparation of varying and uncertain composition compared with the white arsenic. With it we always can be sure how much we take.

In another article, the old key for pulling teeth finds a defender.

Dr. Essig's *Dental Metallurgy* is partly translated, and does not lose anything by the translation.

From a little notice, we see that an article about the application of homeopathic drugs in dental surgery has been published. Why not one of Catholic charms, or laying on of hands, or the power of Baal in excavating teeth, or that of the spirits in condensing gold fillings? Homeopathy and dentistry!

TRANSACTIONS OF THE NEW YORK ODONTOLOGICAL SOCIETY FOR 1883. Published by the S. S. White Dental Manufacturing Co., Philadelphia.

The "Transactions" of this society are too well known for merit of a high order to require an extended notice. Any dentist will consider himself fortunate who possesses a copy.

THE ORIGIN OF DEFECTIVE ENAMEL. By Prof. W. H. Eames, with opening discussion by Prof. L. C. Ingersoll. Read before the Illinois State Dental Society, at its Twentieth Annual Meeting, Springfield, Ill., May 13, 1884. Reprint from Transactions of the Society.

A very interesting paper and discussion.

MICROSCOPICAL STUDIES UPON THE ABSORPTION OF THE ROOTS OF TEMPORARY TEETH. Whitney Memorial Prize Essay of the Dental Society of the State of New York, 1884. By Frank Abbott, M. D.

Reprinted from the *Independent Practitioner* of July, 1884.

UNIVERSITY OF PENNSYLVANIA: Catalogue and Announcements for 1884.

EDITORIAL.

THAT OPENING PRAYER.

We have received, since our last issue, several communications relative to the editorial reference it contained to the "opening prayer" at the Saratoga meeting of the American Dental Association.

We hardly need to say that we are not surprised. We did not expect that all would agree with us. We are only surprised that so few have protested against it, and that so many have commended our course. We might well let the matter stand as it is were it not for the fact that a few seem to understand us to attack prayer *per se*, instead of the custom of introducing a prayer on such occasions. If such will read the item carefully they should see their error. We consider a discussion of prayer per se out of place either in a dental *journal* or a dental *convention*. Consequently, we argue against the custom of "opening" dental meetings with prayer, especially a "hired" prayer. But if they are introduced and become a part of the regular proceedings, they may become the subject of criticism as regularly as any other part of the proceedings that come in the regular order.

Now, what are the facts in this case, and what are some of the reasons why this old custom should be omitted? We answer that it is inherently "out of order." This was a meeting of *dentists* organized and banded together for the sole purpose of discussing and advancing the *science of dentistry;* the membership of the society is made up of those who hold to *all* shades and *no* shade of religious belief; there are those who devoutly reverence and observe prayer, and those that indifferently observe it if they observe it at all—together with those who as conscientiously disbelieve in it and honestly look upon prayer as a mere sentimental formality; there are protestants, catholics, jews, atheists and infidels to be numbered in the membership of this and like societies, and all standing upon an equal basis as regards the organic laws and purposes of this society. Those who believe in prayer also believe in different methods and forms of its observance, and to those who do not believe in it it is an impertinence or, at least, uncivil to impose it upon them by the force of a majority vote. Now the protestant and the atheist may regard each other with feelings of commiseration, the catholic and infidel may earnestly and conscientiously desire to convert each to the other's standpoint of peculiar opinion and belief, but we respectfully submit that they must seek some other opportunity and occasion than the hours of a *dental* meeting in which to exhibit their differences and exert a converting influence each upon the other. There are political as well as religious differences adhered to by the membership of the society, but no one would think for a moment of introducing political questions or statements in any form into a meeting of this kind; and yet we fail to see why one is not just as much inherently out of order as the other.

Then, again, a wise and manly *toleration* demands that the custom be dispensed with. If one class of members have "*tolerated*" the "opening prayer" for so long a time out of a spirit of courtesy and politeness, it does not follow that the other side should not take its turn at courtesy and politeness, at least to the extent of *omitting* a custom that is offensive to some who have equal rights with themselves. Suppose, for instance, that the "infidel" portion of the meeting had called for the reading of a chapter from Payne's "Age of Reason;" would not the presiding officer have ruled it out of order? We knew of just such an instance not long since, and the president very justly ruled it "not in order;" but the reply of the *mover* that "the motion is just as much in order, sir, as that prayer of Dr. ——," which had just been uttered, seemed to express very clearly the universal sentiment of the meeting. The first horse race on Springfield's famous Hampden Park was opened by prayer by the Rev. Henry Ward Beecher, but the custom has been wisely dropped of late years, with no probable detriment to religion. And so we believe that a thoughtful apprehension of the facts in the case will lead those whose regard for prayer is most sacred to agree in dropping it on all such occasions where, at the best, it is little more than a mere formality. To be cast about as a mere formality, out of deference to a polite custom, can only serve to *cheapen* real prayer in the minds of reasonable men. In simple justice, then, to all let the prayer be banished hereafter from the "street corner"—the programme—and remanded to the "closet," in accordance with the wisdom of one of old.

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The annual meeting of the Connecticut Valley Dental Society will be held at the Haynes House, Springfield, Mass., Nov. 13 and 14, and will be of special interest.

AN ANNOUNCEMENT.

For some weeks past we have had under consideration an important change in the affairs of this JOURNAL. As a result, we have to announce that this number will close the existence of THE NEW ENGLAND JOURNAL OF DENTISTRY, *per se*. Arrangements are effected by which this JOURNAL and THE ARCHIVES OF DENTISTRY are to consolidate. Several months since "*The Dental Journal Association*" was organized and chartered by leading members of the profession in the West, for the purpose of publishing an independent dental journal. It purchased, as a nucleus, the *Missouri Dental Journal*, and has issued its ninth number under the title of *The Archives of Dentistry*. After mature deliberation, the publishers and editors of the NEW ENGLAND JOURNAL OF DENTISTRY have decided that the interest of the profession may be best served by uniting their forces with this "Association;" and for the purpose of giving our subscribers an opportunity to form the acquaintance of the combined journal, they will be supplied with it for the balance of the year. The Association will have the entire control of the editorial work of the journal, but arrangements have been made with J. H. Chambers & Co., of St. Louis, Chicago and Atlanta, for a term of years, for its publication. The whole country is being organized for editorial work, and no effort will be spared, by editors or publishers, to make the *Archives* a national journal, acceptable in every sense to the profession.

In thus merging ourselves with the *Archives of Dentistry*, we take no backward step; it is, rather, an important step forward, and one that is, in a certain sense, imperative. The NEW ENGLAND JOURNAL OF DENTISTRY was started in a modest way, and with special reference to local interests, as its title implies. On its third issue, however, it became self-supporting, and it has had a steady and sure growth until the present time, when its circulation has vastly overflown the limits of its implied territory. In attempting to adjust ourselves to this new demand upon us, we believe we have effected by this combination the best possible arrangement. We have many thanks to offer the friends of the NEW ENGLAND JOURNAL, and fully believe that in taking this step we are doing that which results will show to have been the wisest. Our advertisers will surely suffer no loss by this arrangement, as the new publishers will fulfill the terms of our contracts in every detail.

Subscribers will be furnished with an index to this volume in due time.

THE NEW ENGLAND DENTAL SOCIETY.

The twenty-second annual meeting of the New England Dental Society was held at Boston on Oct. 2d and 3d. The first day's meetings were held at Hawthorne Hall, Park street, and the second at the Harvard Dental School building on Grove street. Routine business occupied the attention of the society at its first session, during which a large number of new members were admitted. The first paper of the afternoon session was read by Dr. R. R. Andrews, of Cambridge, Mass., on "The Development of the Teeth." This paper was of special interest inasmuch as it was intended by its author to be a demonstration of certain errors set forth in an address that was delivered before this society, on the same subject, at its last meeting, by Prof. Garretson. The exhibit of many splendid diagrams and photographs of his own work in histological research added greatly to the interest and elucidation of the subject. We published last year the address which this antagonizes and shall have the pleasure of soon laying Prof. Andrew's paper before our readers.

Dr. Bödecker, of New York, who was present, stated that he had never seen, in his studies of embryology, what Prof. Garretson announces in connection with this subject. The drawings which Prof. Andrews exhibits before you here are correct according to my own observations. Can indorse everything that Dr. Andrews has alluded to.

The next paper was given by the special guest of the society, Dr. J. F. P. Hodson, of New York; subject, "Crystal Gold." The paper is one of great practical value and was listened to with marked interest. The discussion that followed brought out many valuable points and showed a general interest in the subject, as well as being highly complimentary to Dr. Hodson. The appreciation of Dr. Hodson and his paper, on the part of the society, was manifested by electing him to honorary membership. This paper also we shall publish soon, together with the discussion that followed it.

Dr. How, of Philadelphia, being present, was given time to explain and illustrate his methods of applying the "How Crown."

The evening session was devoted to the Herbst Method of Filling Teeth. A paper was read by Dr. A. M. Dudley, of Salem, Mass. (to be given in our next number), after which Dr. Bödecker, of New York, who had just returned from Europe, where he had spent several days in the office of Mr. Herbst, detailed at great length his own and Mr. Herbst's latest experiments and improvements. The greatest obstacle to the introduction of this method in this country seems to be the fact that American golds are not adapted to the necessities of this method. At present there is but one manufacturer —Wolrab, of Bremen—who possesses the secret of preparing gold that gives entire satisfaction. The duties on the importation of Wolrab's gold are so high—about 55 per cent.,—that, at present, at least, the method is not likely to become very popular. Dr. Timme, of Hoboken, has, however, a limited supply, and those who may wish to experiment with this new method may obtain it from this source. The S. S. White Dental Manufacturing Co. already have in stock the instruments necessary for its use. Our American manufacturers of gold foil will doubtless succeed in solving the secret of its preparation at no distant date. Dr. Bödecker is quite enthusiastic in his advocacy of this method and deems it of much importance in, at least, very many cases that come into our hands. He considers it to possess an advantage over the old methods in that by it gold may be more perfectly adapted to the walls of the cavity. Much valuable time may be saved thereby, retaining points or pits may be avoided, thus saving the consequent weakening of frail tooth structures, the doing away of the annoyance to the patient of malleting, and because of the fact that so little pressure is needed to consolidate the gold a much frailer tooth may be filled by this than any of the old methods. Dr. Bödecker exhibited many beautiful specimens of gold fillings made by Mr. Herbst, and which he kindly loaned to Dr. Bödecker to be shown to the profession in this country. Many of these were large and difficult cases and were made by this method in a surprisingly short time. In consideration of the professional kindness of Mr. Herbst in thus giving to the profession in America, through Dr. Bödecker, all the information possible regarding his new method, the society unanimously instructed the secretary, Dr. Dudley, to formally communicate to Mr. Herbst its cordial thanks.

The Herbst method, as described by Dr. Bödecker on this occasion, is so concisely and admirably set forth by Dr. W. D. Miller in the October number of the *Independent Practitioner* that we reprint it here. We might almost say that Dr. Bödecker said it. Both are evidently familiar with the methods of Herbst.

"This method is especially characterized by two features. The first of these is the extensive use of the matrix (Dr. Bödecker uses a matrix made from a watch spring), for approximal cavities, the second the employment of a rotating, smooth-pointed instrument for condensing the gold.

The operation may be best made clear by describing a case in practice. We have to fill the left upper bicuspids, both decayed on the approximal surfaces. The cavities are opened to the grinding surface and prepared as for inserting a cohesive foil filling, with exception of retaining points, which are never made. The matrix is now brought into place, and the point of a steel pin inserted between the matrix and first bicuspid from the buccal side, and if necessary from the lingual side also, so as to press the matrix tight against the surface of the second bicuspid at the neck; warmed shellac is now packed into the cavity of the first bicuspid to hold the matrix firmly in position. After the cavity of the second bicuspid has been filled, the shellac and matrix are removed, a second higher (wider) matrix inserted and pressed by the same means as before tight against the surface of the first bicuspid, which is then ready for filling. Should the second bicuspid be wanting, then the matrix is held in position by filling the whole space between the first bicuspid and the first molar with shellac. The matrix being in position, three or four cylinders of Wolrab foil No. 2, 3 or 4 (or an equivalent of Wolrab foil No. 4 made into pellets) are brought into the cavity just as they would be into a simple cavity on the grinding surface, and fixed into position by pressing tightly upon them with one of the larger burnishers of the set, slowly rotating. It is then condensed by a succession of strong taps or pressures of the rapidly rotating instrument, No. 5.

(The surface of the instrument soon becomes coated with gold, which must be removed by pressing it while rotating upon a piece of pure tin.)

This is then followed up by an ordinary hand plugger, to ascertain whether the gold has been properly condensed at all points. The above process is repeated until the operation is completed, the surface of the gold at last being thoroughly condensed by means of one of the smooth polished instruments of the set.

In filling large cavities on the grinding surface, first two, three or four cylinders of No. 1, 2 or 3 Wolrab foil are pressed against the bottom of the cavity with the pliers, and then with one of the *polished* instruments, *slowly* rotating, fixed in position; if it does not at once become firm, more gold is put in till it does; it is then condensed with No. 5, *rapidly* rotating, and this instrument is then used almost exclusively till the gold is all in; then No. 1–4 or 7 is used for condensing the surface.

Approximal cavities in the central incisors are treated as follows (previous separation by means of cotton having been secured): The cavities are prepared slightly broader at the bottom than at the opening; no retaining points are required. Two or three cylinders of No. 2 Wolrab foil are pressed into the first tooth towards the gums, likewise into the second tooth, and condensed with No. 5; this process being repeated till both cavities are overfilled, so that the gold in the two fillings appears to form one continuous mass.

Then No. 15 (a clean, fine needle), slowly rotating, is pressed through between the filling at different points, and the separation completed with a fine file. The fillings are then further condensed by Nos. 12–14, rapidly rotating, with interrupted pressure."

The second day's meeting was held at the Harvard Dental School's building. Called to order at 9 o'clock, President William Barker, of Providence, in the chair. The first business was the election of officers for the ensuing year, which resulted as follows: President, James Lewis, M. D., D. D. S., Burlington, Vt.; First Vice-President, J. B. Coolidge, M. D., D. D. S., Boston; Second Vice-President, G. A. Young, D. D. S., Concord, N. H.; Secretary, A. M. Dudley, D. D. S., Salem, Mass.; Treasurer, G. A. Gerry, D. D. S., Lowell, Mass.; Librarian, G. F. Waters, D. D. S., Boston, Mass. Executive Committee, T. Fillebrown, M. D., D. M. D., Boston; D. B. Ingalls, D. D. S., Clinton; E. O. Kinsman, D. D. S., Cambridge; C. W. Clement, D. D. S., Manchester, and C. H. Osgood, D. M. D., Boston. The next meeting will be at Burlington, Vt., October, 1885. The balance of the session was given up to clinics and the examination of exhibits of dental appliances. Clinics were given in both the operating and laboratory rooms of the college. In the operating department the prominent clinics were the illustration of the Herbst method of gold fillings, by Dr. Bödecker, and the setting of crowns by Dr. How. In the laboratory a new method of Continuous Gum Work was illustrated by Dr. Timme of Hoboken. Clinics were also given in Tooth Carving; Dr. Seabury also exhibited his new rubber- and celluloid apparatus, showing its practical working, besides several clinical demonstrations of less importance by different individuals.

After the adjournment the society proceeded to visit the New England Mechanics' Fair in accordance with an invitation received from its managers. On the whole this was one of the best meetings which this important society has held. It was not as largely attended at all of its sessions, and the interest was not perhaps as absorbing, as at its meeting at Providence, last year. More attention was given to the practical concerns of the profession and less to the scientific problems than at the Providence meeting, thus perhaps gratifying the largest number. About twenty-five names were added to the membership—making it more than two hundred—which probably makes this society the largest dental society in America, if not in the world. It certainly is one of the strongest and is well equipped for a prosperous future.

Correction.—On page 330 of the September issue of our journal we spoke of "Dr. Weal (?) of Albany." As the interrogation mark shows, we then doubted the correctness of the name. "Dr. Weal" has been so kind as to inform us that his name is Dr. C. F. Wheeler, of Albany.

Dr. D. M. Clapp, of Boston, has utilized the electric current that flows over his house through the medium of the Electric Light Company's wires by making it operate his dental engine motor, thus avoiding the care and trouble of a battery. As far as we are informed this idea is original with Dr. Clapp. By a simple contrivance he can regulate, with the foot, the rapidity and power of the engine to suit the demand.

An excellent combination for the treatment of pyorrhœa alveolaris has been suggested by Dr. J. A. Robinson, of Jackson, Mich., viz: A combination of equal parts of caustic potash and carbolic acid rubbed together in a mortar so as to form a crystalline paste; cotton fibers are twisted together to the size of ordinary yarn and saturated with the mixture, which is pushed down into the pockets and left for awhile. The operation is painless, and one or two treatments are said to be sufficient to cure a most severe case of pyorrhœa alveolaris. The same remedy is said to give excellent results in obtunding the pain while cutting out a decay.

Dr. Robinson, who is a veteran in experience and practice, is very enthusiastic over the results obtained, and we advise all our readers to give the suggestion from such an old practitioner a thorough trial.

THE
NEW ENGLAND
Journal of Dentistry.

VOL. III. NOVEMBER, 1884. No. 11

ORIGINAL ARTICLES.

> "Of all the arts in which the wise excel,
> Nature's chief masterpiece is writing well."

A CONSIDERATION OF THE RELATIVE MERITS OF WATTS' CRYSTAL GOLD AMONG FILLING MATERIALS.

BY J. F. P. HODSON, D. D. S. NEW YORK.

Read before the New England Dental Society at its Twenty-Second Annual meeting, held in Boston, Oct. 2 and 3, 1884.

MR. PRESIDENT AND GENTLEMEN—It is with much diffidence, and yet with a lively sense of the honor you have conferred upon me in extending to me the special and very kindly invitation to appear before you, that I am here to-day, and, while thanking you for the distinguished courtesy of which I am the object, cannot but feel how very greatly you might have bettered the selection of your object than your subject. For, very truly, there are few, if indeed there be any, which ought more properly to engage our most serious consideration, than the comparative merits of filling materials for the teeth, as few I think will question, that whatever our surgical or other dental skill or ability, the perfect stopping is, in a very real sense, the *ultima thule* of all dentistry.

As, however, it has been very delicately hinted to me by your committee that your especial hunger is for practical facts, rather than theoretical disquisition, I will plunge at once into the thick of them by the introductory premise that "Watt's Crystal Gold" is not to be confounded with any of the other so-called crystal golds which we have offered us from time to time. It is, as superbly shown under the microscope, an interlaced mass of perfect golden fern leaves, which have been grown up from, and in, the continually saturated solution of gold, by a process of electrical action. While all others that I have ever examined show no organization whatever, but are a mere agglomerated mass of gold particles, which cohere temporarily like wet sand, and are, moreover, produced by chemical action, mercury, etc., methods which were experimented with and abandoned by Watts at least 25 years ago.

I have used this beautiful form of gold exclusively for something more than fifteen years, and associated with other golds, before that time, and so say what I do know, that all operations which can be accomplished with any other gold, or by any other operator, can be at least as perfectly accomplished with this, and with less expenditure of force and strain, and indeed in every sense, with far greater ease of manipulation than with foil golds. Crystal gold possesses moreover some excellencies which do not obtain in foils, one of which is the steel-like hardness of surface of the fillings produced with it, which in grinding surfaces is so especially valuable for their resistance to, and withstanding of, the battering force of mastication, and of the cusps of opposing teeth, and in the exquisite perfection with which it adapts itself under honest manipulation to the walls of the cavity, indeed so close and perfect is it, that delicate pointings of the microscopic crystals have been shown to have entered open ends of the dentinal tubuli themselves. This waxy adaptiveness would be, under any circumstance, a most valuable attribute, but it becomes doubly so when taken in connection with the fact of the gold being condensed with so little force as compared with foil. In such circumstances, for instance, as very frail front teeth, where for appearance sake, it is often expedient to save every atom of even thin remaining enamel, the value of this quality in crystal gold is inestimable, and I wish to be perfectly understood in regard to condensation, in such circumstances of frail walls as just instanced.

The filling should be of course, and is, with faithful manipulation of this gold with small points, practically as closely adapted and as well consolidated against these walls and throughout the stopping, as if against strong walls, and all this where a proper condensation of foil would be far more likely than not, to rupture the enamel, even granting to the foil the most skillful manipulation. If crystal gold can be depended upon to do this so delicate and refined work among "egg shells," what must be its capacity for easy and perfect adaption in the great mass of the usual cavities having strong walls. I deem it a work of supererogation to enlarge upon, or even do more than suggest the point to intelligent professional gentlemen, This wonderful combination of all the compliant and waxy characteristics of "soft" foil with even more of the cohesive quality than is possessed by most cohesive golds, and superadded to this,a very hard finished surface peculiarly its own, are the especial characteristics of Watt's Crystal Gold, and from such a superb *tout ensemble* for gold filling material as that, the application of the motto "multum in parvo" seems especially appropriate.

As I have previously said, I have used this form of gold exclusively for more than fifteen years, and although I always have a quantity of other gold in my gold drawer, and, get most new varieties as they appear, and keep them more or less even on my trays, because I do protest that I despise the prejudiced and obstinate riding of a hobby, and always feel ready to use any gold or any material that I can produce the best results with, in any and each individual case. I am nevertheless wholly unable, as a general rule of every day practice, to find any place in any cavity where I can possibly employ them to any advantage as compared with crystal gold, and am constrained to store away the pellets and cylinders, etc. in the body of large stoppings from time to time, *to get rid of them.* "Aha" I hear some captious critic say "so you *do* manage practically to combine foil with your crystal gold after all." Don't think so gentlemen, I merely and truly, as I say, having kept some foil preparations for a time, I seek to dispose of the—to me—useless material, by putting it where, possibly many of you would say, it would "do the most good," where for myself I would say it could "do the least harm," in the centre of a large stopping, and precisely as I would stow away pieces of crystal gold which had become in any way somewhat condensed, and, in my opinion, unfit to place next the walls. One exception, however, to my exclusive employment of crystal gold, which I wish to mention, is my habit, as a mere matter of extra prudence, of binding together a largely built out restoration in gold, with occasional strips of heavy foil, feeling that the magnificent hardness of condensed crystal gold might possibly militate against the toughness and consequent integrity of a long, thin restoration. Beside this negative proposition as to my employing no other gold, I wish to place the positive one, that I *do*, with *very* rare exceptions use, only this; that is to say, so far from employing it only for usual operations, and then plastering up all the difficult or large ones with amalgam, I almost never—probably not nearly as often as I ought—employ amalgam, or other plastic filling materials for permanent teeth, and as seldom order teeth out. And I say all this in order to make the point, and to make it plain, that I *never hesitate about doing any operation whatever with crystal gold*, that I depend upon it for all and any dental stoppings or restorations whatsoever, small and great, easy and difficult, and that if any failure occurs (and I am not, I hasten to assure you, one of those transcendent operators who never, never have them) I *know* the failure to be consequent upon my, somehow or somewhere defective manipulation, and not any fault of the gold employed. For instance, if I were to "take a piece as large as the cavity"(as, for many years the instructions accompanying it directed, and which some operators who use it, apparently do now), and jam and plaster it into the cavity trusting to some magic of affection in the gold to seek out the walls of the cavity and cling to them, I should fully expect, as a consequence, the leaky and worthless stopping that is so often seen, and which advertises to all who see it, not the incompetency of the gold, but of the operator who essayed to place it.

Notwithstanding the beautiful, even silky, softness and pliancy of crystal gold as it takes its place in the cavity, it becomes hard under manipulation, and that very quickly, and being cohesive to the last degree, must be treated after this first placing in the cavity like cohesive foil, and, as I have said in a previous paper, if crystal gold be given the same honest care that a conscientious operator would in like circumstances apply to cohesive foil, he would surely produce the same perfect stopping, and in addition receive the benefit of the grand combination of the special beauties and advantages in both soft and cohesive golds.

It is absolutely imperative that the first pieces of crystal gold be held immovably in the position in which they have at first been placed, and retaining points, or an angle of the cavity may be employed for the purpose. My own very decided preference, however, and the method which I employ wherever possible, is to arrange to hold the completed stopping by the general shape of the cavity, rather than by means of the deep pits so often employed, as I greatly deprecate any so unnecessary reaching out toward the pulp with conductive material, as are these retaining points when filled. In this case the first pieces may be held accurately to their position, by means of a pointed instrument in the left hand, continuing its employment till in condensing these first pieces, and proceeding with the stopping, the shape of the cavity is found to hold the gold securely without it. Condensing each piece finally as one progresses, exactly as a careful operator would proceed with cohesive foil, for as I have before remarked crystal gold, *when first applied to the cavity*, is waxy and adaptive as is the softest of soft foils; but there this similarity ends, as it should, and this first application being once made, it must be treated thereafter precisely as though it were cohesive foil.

A good operator when applying a cohesive foil pellet to the cavity would not proceed to disintegrate it by punching it full of holes with a sharp point; neither would he on the other hand attempt to model large thick pieces of it into position with "spoon" modellers and expect anything but a worthless uncondensed cavity-full of something akin to loose shavings or sheet iron scraps as a result. Neither would he jam a large mass of cohesive foil into a cavity, and by thrusting wedge shaped instruments down through it, expect to force it to spread out sidewise and form the perfect adaptation to the walls of the cavity which the merest professional child ought to know is the *sine qua non* to the saving stopping, and yet gentlemen do all of these things, commit all of these sins against crystal gold, and then cry all maledictions upon this gentle material, for the results, forsooth. "You miserable lamb," says the wolf, standing in the stream above him; "how you have roiled up and spoiled this water for me. I will therefore destroy you."

If gentlemen would but—for instance—take the cake of gold carefully and gently between the fingers of the left hand, and, with long pointed tweezers in the right, as carefully push off-without too close approximation of points of the tweezers—a trayful of small pieces, and then, the rubber dam being in position on the tooth, of course, the cavity dry, etc.—take up one of the pieces on the end of such filling instrument as would be employed were cohesive foil pellets being used (in any shape, so that 'tis small, and is very finely serrated), carry it through the annealing flame, and to the position in the cavity where it is designed to commence the stopping, hold it absolutely still, until it has been fully and entirely condensed, employing any means of condensation which would properly consolidate pellets of cohesive foil, add other pieces, in the same manner, still holding the compacted portion immovably, until it will of a certainty hold itself, adding no single piece however, till that already in the cavity has been fully and finally consolidated, never changing the position of any pellet after its first application to its place, using so small pieces as to be *sure* that no piece is added which, from its size or thickness, they could not, with absolute certainty, condense throughout its substance, without chopping or punching it full of holes, packing directly against the walls of the cavity, and remembering that no cohesive gold spreads or wedges out under manipulation like soft foil, and that consequently all packing must be done directly upon the part desired to be compacted.

In a word, proceeding throughout the operation precisely as though it were cohesive foil pellets which were being employed, and, my word for it, they will be surprised and delighted to find how they would be accomplishing the same results with this gold as with foil, and with how much greater ease and pleasure and delicacy they were doing it.

If then they continued to the end of the placing of the gold and polishing and finely finished the exposed surface, they would find in that such resisting steel-like hardness as is implied in the fact that a patient will return days afterward to have a mere nothing taken off from the surface; *they can't hammer it down*, slight excess tho' it be.

My own preference has always been for No. 1, in contradistinction to the more condensed Nos. 2, 3 and 4, and for such delicate handling of even this, as that it shall certainly *be* No. 1, when it reaches the cavity, and not have been handled and pressed into the equivalent of No. 3 or 4; as the very essence of the value of crystal gold—to my mind—lies in the tremendous difference in bulk between the exquisitely soft silky state in which it comes to us, and its finally consolidated one in the cavity, and that the great change taking place under the guidance of the instrument of the operator implies all of the possibilities of the marvelously close adaptation to the walls of the cavity of which I have spoken, but which superb attribute of crystal gold is deliberately thrown away, to start with, by using the condensed Nos. 2, 3 and 4,and equally so, by the careless handling and squeezing of No. 1. In short I want to do all of the condensing *in the cavity*.

The ultimate destination of us all, with our varied methods and golds, is the goal of the perfect stopping or restoration, and each being devoted to his own method, and becoming skillful in it, it becomes *his* best one, and we may learn much from these specialists, even tho' we ourselves may either not be specialists, or that we even do not at all employ his particular method.

The soft-foil operator teaches us much about adaptation. The heavy foil man—I'm a little lame here—perhaps the want of it. The cylinder operator about rapidity of operating. The electric foil man lauds its lead-like ductility. This cohesive foil man his general power to restore beyond the cavity, *chacun a son gout*. But it is obviously unfair for one man to test another's method or material by his own manipulations, and then depreciate Pegasus, because forsooth he don't yoke with his ox!

There are many different ways of getting from New York to Liverpool, and, barring accidents, one reaches there certainly, by any one of the many lines, but as between them, ones comfort and pleasure on the way, and his condition upon arrival there are questions upon which each will have his own opinions and predilections; but supposing one to have been long accustomed to the cabins of a "Cunarder" or an "Inman Liner" in his passages across, and upon the representations of a "White Star" patron, decides to try—say—the "Germanie." It is certainly very unhandsome in him, not to say ridiculous, after having heedlessly stumbled down into the hold at the beginning of the voyage, and as heedlessly remained there to the end of it, to go stamping about Liverpool upon his arrival out, exclaiming against the manifest discomforts of the White Star Line and his passage on it, that he was rolled and tumbled about, cut and bruised till he was "all broken up," and indignantly repudiating a suggestion as to his being "tight," or that he had been in that—to him—detestable condition from the first, declaring that indeed he was so very badly off, that he must now go into hospital to be made over new; and that if there was any one thing sharply defined in his mind, it was that he would never, never use that method of getting to Liverpool again.

"What's that you say; elegant promenade deck and superb sleeping and dining cabins; reading-room and smoking-room and all that?"

"I don't believe it. I never found 'em."

DISCUSSION.

Dr. Fillebrown.—This paper of Dr. Hodson's is so complete in itself there seems to be nothing to say in addition or discussion. I honor a man who has devoted himself to one line of thought or practice and developed it to such a degree of perfection as this; and a so well digested and clear an account of that work, as is the paper just read, I prize very highly. Dr. Hodson's practice illustrates very forcibly the fact, which we all appreciate in some degree, that satisfactory results may be reached by totally different methods. That the doctor obtains good results goes without the saying, for he is one of the very best operators among us.

In my own practice I rely mainly on cohesive gold foil, used in a very attenuated form, one fifth of a sheet of No. 4 rolled into loose ropes and cut into lengths to suit. This is so plastic that it will easily go anywhere a point will follow. I use other forms of gold incidentally—more than that—frequently, in almost every cavity, and crystal gold is always on my case and is often used. Many of our fine operators make non-cohesive foil their main stay, using cohesive gold incidentally to finish with, and thus obtain excellent results. The essayist relies mainly—almost wholly—on crystal gold; using other forms only incidentally and perfect work is the result. Crystal gold I believe and know, to be a perfect form for a filling material, and the operator who takes it for his chief reliance makes a good choice. I thank the doctor for his paper and for his presence, and heartily join in his sentiment that the best way to do a thing is the way you can do it best.

Dr. Clapp.—I am happy to have Dr. Hodson present to-day and give us his experience with crystal gold. A few of us who knew something of his reputation as an operator and his almost exclusive use of this material, wanted him to come and give us the benefit of his experience. And so we have succeeded in inducing him to be here to-day, although at a considerable sacrifice to himself. It has served to bring to our attention the value of crystal gold. Hereabouts it has been much overlooked. I have used it but little. It has qualites that other gold does not possess. Asked Dr. Hodson how he uses it; whether he uses hand pressure or the mallet, etc.

Dr. Hodson.—As I said in my paper, any method of employing force for the condemnation of cohesive foil pellets or cylinders is appropriate in the same circumstances,to crystal gold. I specify pellets and cylinders because ribbon gold or simply layers of heavy foil can be beautifully consolidated with the electric mallet. Crystal gold cannot because of the superficial nature of the blow and the absence of pushing force in this instrument, and as I have pointed out, crystal gold is prone to condense a crust upon its surface under such action, leaving the underneath part of the pellets uncondensed. If I can get direct action for the mallet, I use it both for rapidity of execution and delicacy. In, however, operations or *parts* of operations where,in the employment of the mallet its action would be to drive the gold away from the walls instead of in direct apposition to them, I certainly should not use it, but should turn to hand pressure,and this happens so constantly during the day's operations, and in different parts of each operation, that I question which I most employ, the mallet or hand pressure. Both sets of instruments are to my hand and are applied to the work according to the demand of the moment.

Dr. Clapp.—I use all the various methods employed in filling, and the varieties of gold also. I fill each cavity by itself; using such methods and material as will enable me to accomplish the desired end in each case in hand. As yet I can use no cohesive gold in undercuts.

Dr. Wetherbee.—I am quite familiar with the history and qualities of crystal gold. I first used it February 7, 1855. The crystal gold of that day was very imperfect when compared with that in use at the present time. A good and substantial filling can be made with crystal gold.

The first point I make is this: that it requires more time, in many cavities double the time,than that of other forms of gold. If time is money, and it is so reputed, then there is a needless waste of the energies of the operator.

The second point is: that there is far greater liability of imperfection at the cervical wall than where other forms of gold are used. In the use of pellets of proper size and partially annealed we have a sufficient quantity of gold to be carried against the cervical wall, and extending beyond so as to allow of the most thorough impaction. If retained in position, other pellets may be added until we are ready for the use of cohesive foil. By this method I have a sufficient quantity of gold covering the cervical wall to allow perfect condensation. That portion of the filling being dressed down to a thirty-second part of an inch of the margin of the cavity, is heavily burnished,thereby expanding the gold, bringing it into positive apposition with the *parietes* of the cavity. If there shall be a space of a five hundreth part of an inch between the gold and the wall of the cavity which cannot be determined by the eye unassisted, it will be fatal to the filling. Crystal gold does not expand under the pressure of the burnisher, nor does cohesive foil except to a very limited degree.

The third point I make is: that in deep-seated cavities crystal gold is not so easily or so surely impacted against the labial wall of a central incisor, especially when small space can only be obtained, without serious injury to the form and beauty of the tooth. In such I invariably use non-cohesive foil. It is carried before the instrument to the point indicated and thoroughly impacted, assuring a perfect filling. This was my method when using crystal gold, and is, in like cases, my present method when using cohesive gold.

My fourth point is: that when severe wear or strain by attrition supervenes, it has not the strength or resistance of cohesive foil. It more readily wears away, leaving imperfect margins. For these reasons I long since gave up the use of crystal gold in my general practice.

Dr.Andrews.—I am very much pleased with the paper of Dr.Hodson. I am one of the "few of us" spoken of by Dr.Clapp,who wanted him to come and tell us his experience with crystal gold, because I have used it for many years, and I believe in it. I know I can depend on it. Those who think they can make good fillings of it and make them rapidly are mistaken. It needs the same skill and care that you give cohesive foil, perhaps more in filling around the edges of a cavity. I use it alone and in combination with cohesive and soft foil. If,during the next ten years I could get only one preparation of gold, I should prefer crystal to any other form.

Dr. Waters.—I wish Dr. Hodson would place upon the blackboard the appearance of crystal gold as seen by high powers of the microscope.

Dr. Hodson.—You presume me to be an artist.

Dr. Waters.—Exactly. I have no doubt on that point. Artists work to an idea, and every successful dentist does the same. He sees the end from the beginning and works towards his highest conception of what is true as well as beautiful. It is only by being good artists that we become expert dentists.

Thirty-five years ago I made some crystal gold. One of my patients was a gilder by profession. I asked him what he did with the rags with which he rubbed off the surplus gold leaf. He said they were not good for anything after he got through with them, they were so dirty; and so he threw them away. I asked him to bring me some. He did so. I incinerated them and lixiviated the ashes in aqua-regia, which, after standing some time, I decanted the supernatant fluid and then parted therefrom the gold, silver and copper. The gold was thrown down in a crystalline mass; not the light and feathery article which we now know as crystal gold, but a rather coarser article. That, I did not have skill or patience enough to work successfully. It would crawl towards the instrument with which it was packed just as the first cohesive foil did.

One of the chief hindrances in the way of making a perfect filling is the difficulty in securing a good coaptation at the periphery of the cavity. The doctor here illustrated his method of filling certain cavities by means of mats of gold made of No. 4 foil, folded and cut so as to present the edges of the foil mat at the external surface. [A cut would be necessary to illustrate his method, which we have not the time to give.—Ed.]—"I often find, in fillings that I see, a defect at the cervical wall where the surface of a tooth is depressed at the neck, the gold having been filled straight across, leaving a projecting edge, under which foreign matter accumulates, ferments, and decay is the result. In filling with cylinders of gold there must of necessity be a cuneiform space at the joining which will in the same way give a start to decay."

Dr. Hodson.—In reference to the remarks of my much esteemed friend, Dr. Wetherbee, I have but to say that I fear that much soft foil "hath made him mad," all of his assertions being in direct contradiction of everything in the paper I have read, and to my continual and daily experience of the many years in which I have used crystal gold exclusively in my practice. At the same time he informs us that the crystal gold of long ago, was a very imperfect material as compared with the beautiful one of to-day, *and* that he *long since* gave up the use of crystal gold.

I may merely say categorecally with him, that

1. Crystal gold takes no more time in the hands of one skilled in its use than does other cohesive golds in hands skilled in *their* use.

2. That perfect cervical edges and the utmost refinement of continuity of tooth substance and gold are as universally made by a skillful operator with this gold, as by skillful operators with any other; and the imperfect and worthless cervical edges are made by an unskillful or careless operator with any other gold as well as this. Cervical margins test the skill of the operator, the soft, cohesive, cylinder, pellet, mat, ribbon, and crystal gold manipulators, each being presumably able to produce perfect ones by his own manipulation of his material.

3. What I have just said applies equally to the "labial walls of the incisor teeth." The skillful operator produces elegant operations with whatever material he employs.

4. Is I think sufficiently answered by my paper which specifically points out as one of the grand and splendid attributes of crystal gold its *specially* hard and resistant wearing surface.

In response now to the request of Dr. Waters, I will try to give you a faint idea of the beauty of crystal gold under the microscope. (Dr. H. here drew upon the black-board a very graceful representation of interlacing fern leaves.)

Dr. Gage.—In my own experience there seems to be more trouble with discoloration of crystal gold fillings than with gold prepared in other forms. I would like to ask Dr. Hodson if he can account for it.

Dr. Hodson.—I scarcely know how to answer that question. It is a condition of things which I do not meet with in my own practice. Except very rarely an isolated case where foil stoppings of other operators were discoloring on their free surface in exactly the same way as my own stoppings beside them, and so I have come to feel such discoloration to be due to the action of some chemical, either formed in the mouth or taken as medicine, as chloride of iron, etc.

Dr. Chandler.—Perhaps I can throw some light on this matter of discoloration. Some years ago I went into the investigation experimentally of the discoloration of gold in the mouth. I came to the conclusion that the impurity of the gold had little or nothing to do with it, but that it was mainly, if not entirely, caused by the particles of steel worn from our steel pluggers and left upon the gold wherever it has been touched by them. If the fillings are cleaned and made bright again, they will again discolor, showing that the discoloration is not superficial but that the cause extends all through the filling. Some of my experiments showed me that an almost infinitesimal quantity of steel would have this effect. Our steel pluggers are always worn smooth in process of time. Where do the worn-off particles go if they are not left on the gold? An account of these experiments is to be found in *Johnton's Miscellany*, to which I sent it for publication.

Also quite lately Dr. William H. Rollins of this city has gone into the same investigation much more thoroughly. He has had expensive analyses made of the different makes of gold, and has also striven to obtain absolutely pure acids for the purposes of these analyses. This was found a matter of great difficulty, as impurities persistently clung to them. He succeeded at last, however, and arrived at substantially the same result that I did. His paper may be found in the *Medical and Surgical Journal* for September 4, 1884.

Another point which I thought I established was this, viz., that those golds,as crystal gold for example,which required the most careful manipulation, and therefore the most handling with the instruments and the longer time, are the most likely to become discolored, and *vice versa.*

Dr. Hodson.—It may be that I have "builded better than I knew" in my fear of and antagonism to iron in any form that might get associated with my fillings, and may explain why the surfaces of the fillings in the mouths of my patients are as pure and clean as are those of any of my professional brethren. I am excessively careful of the cleanliness of my plugger points; never, under any circumstances use a new one till I have surely cleaned all possible infintesimal bits or filings or scale out from the serrations, and I so greatly fear a point getting magnetic, and so attracting a bit of iron from somewhere, that I keep all magnets and magnetic instruments in a separate room. For, of course, we must keep a magnet for the purpose of magnetizing a pointed instrument to draw out the little drill point occasionally broken off in a tooth. I was once precipitated into a lot of trouble by an assistant's having heedlessly left a magnet among a drawerful of instruments. I threw them all away.

Dr. Waters.—In manipulating gold from the ingot it is often dipped in acid to dissolve off the flux that adheres to it in pouring from the crucible. Many gold beaters in former times, failing to get a pure gold—copper and iron being the impurities—were in the habit of quenching the ingot, after annealing, in a solution of sulphate of iron or sulphate of copper, and any pores in the surface of the gold would be filled by the quenching and cleaning liquid rushing in to fill up the vacuum. In beating, this would not all be forced out, and when manipulated by steel instruments the acid would come to the surface and act upon the instruments, or the impure metal would itself be dissolved. In either case a red surface of metallic copper, or a dark to a black surface of the oxide of copper or iron would result.

ADDRESS

By Prof. G. V. Black. M. D.,D. ,D, S., at the opening of the Chicago College of Dental Surgery. Oct. 1. Session of 1884-'85.

Ladies and Gentlemen, and Students: You are gathered here this evening for the purpose of beginning a series of studies by which you expect to become fitted for the practice of dentistry. The Faculty of this Institution have chosen that I give the opening lecture of the course, and in this lecture it is my duty to give you, if possible, a better understanding of your future duties in the profession which you propose to enter.

Let me state in the beginning that one's duties to his profession, no matter what that profession may be, includes his whole duty to his fellow man, and to himself. To do this duty requires honesty of purpose, sincerity in the performance of labor, and a correct understanding of the mutual relations of man to man.

These three grand requisites of success we hope each of you have gained in your previous training, so that you come to us with these qualities well fixed and ready to guide you in the special duties that devolve upon you here; for without them, no man can rightfully expect the high measure of success which all must desire.

Dentistry does not differ from the other professions in these respects. There is nothing in this profession which in any wise changes our general duties to our fellow men or relaxes the vigor with which we should labor for the general welfare of the human family; but, on the contrary, the more we learn of the infirmities of men, the stronger should our sympathy with the suffering become, and knit us closer to the rules of right doing. In the prosecution of your studies you will learn more of the mutual needs of men and more of the help that the one may render to the other. Here your study will be man. It is true, much of your time will be spent in the study of the grosser part of man, his material form, structure, and composition; but through this study we expect you to continually approach more and more toward a correct understanding and appreciation of his higher nature; the mental and spiritual. For at the very outset of our studies each of us must perceive that there is something lying beyond the material forms which we are called upon to examine. A force, if you please, that calls these forms into existence, molds their outward conformation,determines their elements, and controls their relationships.

If we examine the human hand we find it composed of bones which have a mutual relation to each other, with cunningly devised joints or hinges by which the end of the one moves upon the end of the other. These relations of the bones are maintained by numerous ligaments, which bear certain relationships to the bones, and to each other. Again, we find that these are threaded throughout by tendons, to which are attached muscles, by the contractions and relations of which the movements of the hand are accomplished. But this is not all of the hand. It is only the grosser mechanics of the hand. Like all other parts of the human frame, it contains in its make up that which is destined to minister to the life of the organ. It is pierced everywhere by minute tubes, arteries, capillaries and veins through which the blood comes and goes for its nutrition, that life may be maintained within its structure. Then we find it everywhere pervaded with nerves through which it becomes obedient to the great central organ, the brain, by which its movements are guided, and without which the whole organ, be it ever so perfect, would be entirely useless to the other organs of the body. All of these we find enveloped in the skin in which the tactile sense is located. All of the parts are woven together into one perfect whole, and all are minutely dependent upon each other.

Without any one of them, or if any become maimed or imperfect, the hand becomes useless, and the whole organism suffers in consequence thereof. For as it is with the hand, so it is with the other organs of the body. Each organ is made up of parts which are mutually dependent upon each other, and each organ is mutually dependent upon the other organs in the general make-up of the body.

Society is similarly framed. Each business or profession has its place of labor, and all are mutually related and dependent upon each other. The welfare of the community depends upon the skill and sincerity with which that labor is performed in each individual case, for it is the individual cases that make up the whole. If the physician neglects his duty, or performs it in a bungling manner, or proves incompetent through lack of diligence in preparation, an individual is injured. Society has suffered in the person of one of its members and has a right to complain. This person has also brought a reproach upon his profession. The same is true of individual actions everywhere, and in the professions especially. For we of the medical profession become by virtue of our special studies, not only the servants of, but the advisors of other members of society in matters of the gravest importance, and society has the right to demand that we be well qualified.

In all the associated parts of the animal body life is maintained. What is life? Webster defines the word thus: "That state of an animal or plant in which its organs are capable of performing their functions." It will be seen at once that this definition is based on certain of the physical attributes of life. It does not tell us what life is, but that life exists when certain phenomena are observed. We say a thing lives when we see it performs certain movements or undergoes certain processes of growth and multiplication. While this may approach as nearly a definition as we are able to frame with our present knowledge, every thinking man, must, when he ponders the subject, admit that this is not life. There exists a power behind all these manifestations that we are unable to explain. What is it that holds the elements of which our bodies are composed together, and gives to the mass its physical form? What is it that determines its cellular structure, and maintains each of these minute portions in its relations to the general mass? We say it is life. The work of nutrition is under the guidance of this peculiar force. Indeed, all the operations by which animal existence is maintained, is the work of life. Yet we can only recognize life through its manifestations. We cannot come in contact with life itself with our physical senses, although these senses constitute one of the highest endowments of life. Matter does not live. Life is a subtle power which invests matter with peculiar attributes, or rather, brings it into subjection for a time, and causes it to take on new and varied affinities leading to complex combinations for the formation of the wonderful forces which we know as animals and plants. Still in the higher sense matter does not live. This power is evident for the time in the animal or plant, and in our common modes of expression, we say, it lives, yet there is nothing there that we can recognize by our physical senses but matter. The animal dies. That power or force which we call life has departed from it, and all at once the phenomena of life have vanished. At this moment there may be no change in the matter. The organs of the body are each in their respective places. Each individual cell maintains for a time its form and composition. Death does not change the physical form. It is simply the withdrawal of that power or force by which these combined phenomena have been carried on and the form constructed. Matter may properly be said to be vivified. It may be brought under the influence of the life force. The machinist may construct a compass for the mariner. He makes his handle of steel, but without the subtle power of magnetism it is useless for the purpose intended. The electrician may store electricity in a Leyden jar, but such a jar is not electricity. He may approach a pointed steel to one of the knobs, there is a flash, and that subtle power which was stored within is gone in an instant. As a jar is not electricity so the physical body is not life. Life is a force, which under certain conditions takes hold of matter and moulds it into the physical forms of our bodies, and the so-called living forms which we see around us. The chemical affinities of matter are the playthings of life force. The molecule is torn asunder and compelled to reform with different groupings of the elements of which it was composed, that our bodies may be formed of their constituents. The roots of plants taken up mineral substances from the earth. The blades attract the elements of the atmosphere, and the grain has formed through newly acquired affinities and a peculiar combination of the elements. The grain is taken into the stomach, and a process at once begins by which its elements are torn asunder and compelled to recombine in other molecular forms for the construction of our bodies. In the chemical laboratory of the life force, the elements of earth and air become grain—the elements of grain become man.

It will be your business while here to study the phenomena of life, and the conditions which are favorable or unfavorable to their maintainance. This is the business of all medical students, no matter what their specialty. The central ideas are the same for all; no matter whether the principal practice be to amputate the shattered limb for the soldier, or to remove the carious portions of the teeth for the soldier's child. Each is striving in his special field to maintain the best conditions for the continued manifestation of life, and the comfort of the individual, under the special conditions in which he is called upon to act. Each strives to remove that which is hurtful, and place the diseased or injured parts in the best condition for future usefulness. To this end we study anatomy and histology, that we may know the structure of the different parts. To this end we study physiology and hygiene, that we may know the functions and relations of the various organs in their healthful play, the surroundings and the food best calculated to promote continued healthful action. We study chemistry that we may attain a better insight into the composition of living structures; that which may serve as foods and medicines; and that we may ward off the dangers of contact with hurtful substances.

By the study of pathology we learn to quickly appreciate deviations from health. These are presented in the utmost variety of form, and require much patient labor for their mastery. You will find in the prosecution of your labors that the laws of disease are in many respects as definite as the laws of physiology, but often even more subtle and delusive. Disease being founded in the disturbance of physiological action, to know the former we must know the latter.

By the study of therapeutics we are enabled to apply to the cure of disease those remedial agents the nature of which we learn in the study of materia medica. All these subjects are blended together in the most intimate way. No one of them can be completely divorced from the other. All are of equal importance to the student of medicine, no matter what his special field of practice. These studies form the basis of the medical knowledge of every intelligent practitioner, whether he be surgeon, general physician, gynecologist, occulist or dentist. Specialties in the healing art do not rest upon differences in the basic facts upon which they are founded, but upon the same fundamental truths; hence, the studies are in a large measure the same for all. An inflammation of the mucous membrane of the mouth may not differ essentially from inflammation of the mucous membrane elsewhere. Again,an inflammation of the knee joint may not differ essentially in its character from an inflammation of the peri-dental membrane; but the localities and structures involved are widely different, and the manipulative and surgical treatment in the two cases must be varied to suit these differences. It is upon the difference in the location of disease, the difference in the structures involve the manipulative application of drugs, and the surgical means employed, that specialties are for the most part founded. Except in the manipulative sense the differences in the application of medicine to the cure of disease has hardly proved a sufficient foundation for a specialty. Hence all the successful specialties are founded in a large measure upon manipulative or surgical treatment. It is only in the more limited sense that specialties in which surgery is not extensively employed have succeeded. The specialist in diseases of the mind would not succeed but for the fact that his patients are gathered together in large hospitals under State management. A few men by devotion to one special line of study, pursued rigidly, succeed in building up a special practice; as has occasionally been seen in nervous and mental diseases, diseases of children and the like. These specialties, if they can be so called, depend for their existence upon the person, the peculiar devotion to this special field of study, and the energy in action to create them, and usually die with their author.

The specialty of gynecology, however, is very different and will grow in importance as a specialty instead of diminish. It does not depend upon the superior power and the insight of an individual, but has grown out of the necessities of the human family and the peculiarities of the surgical manipulations found best adapted to the cure or alleviation of diseases of the peculiar organs with which it deals.

The specialty of the occulist is of a like nature. It was not until the adaptation of instruments for diagnosis and surgical means requiring special dexterity in application that this specialty rested upon a firm foundation. It could never obtain such a general sanction from the medical profession upon any possible theoretic differences in the administration of medicines, for the simple reason that these differences do not exist in nature, and therefore can not exist in matters of practice.

The specialty of dentistry does not differ from these. It also owes its existence to the peculiarities of manipulation rendered necessary by the surgical means found best adapted to ameliorate or cure the diseases of the teeth and associate parts. And it is only on the basis of these necessary manipulations, and the amount of time required for the development of the necessary skill in their performance, that we find any sound basis for the existence of any of these specialties. They cannot be founded on special knowledge of disease, and the adaptation of medicine to their cure. This class of information belongs to the medical profession as a whole.

I would not have you understand from these statements that the general practitioner must know *all* the special phases of diseases of the eye and the special adaptation of drugs for their alleviation that may he known to the occulist. By no means. We expect the specialist to expand in his own particular field, while the general practitioner gives his attention more particularly to his line of practice. This is true and should be true in all specialties of medicine, but it involves no difference in the fundamental doctrines of medical science in these various fields. Hence, the principal studies presented to the student who is preparing for the practice of the specialties, are the same as those for the general practitioner. One other reason exists for the formation of specialties in medicine, and that is the extreme frequency of forms of disease requiring special surgical manipulation. If we examine the well-established specialties, we will find in every case that the diseases treated occur with great frequency as compared with others. This is true in gynecology. It is true in diseases of the eye and ear, and it is pre-eminently true in the diseases of the teeth. Therefore,our specialty is more firmly founded upon the needs of humanity than any other. The gynecologist rarely devotes himself exclusively to his specialty. The occulist is found only occasionally outside of the larger cities, but the needs of the human family for the dentist have made him almost omnipresent. The town is small indeed that will not support one or more dentists. This is explained by the great prevalence of the diseases of the teeth.

Therefore, we find the dentist confining himself exclusively to his specialty, as a rule.

It must not be supposed that because a specialty in medicine rests in a large degree upon dexterity in certain surgical manipulations that this dexterity constitutes the medical specialist—far from it. Of what avail is an elegant operation upon the eye if that operation be not well adapted to meet the pathological state which it is intended to ameliorate or cure? Of what avail is a mechanically skillful operation by the surgeon if from lack of knowledge of pathology it is misdirected? So the mechanically skillful but ignorant dentist may make splendid operations upon the teeth to the injury of his patient, because of inability to form a correct judgment of the pathological conditions. Therefore, manipulative ability alone does not constitute a medical specialist. Without the knowledge that will enable him to diagnose clearly and apply his dexterity wisely to the alleviation or cure of pathological conditions, the man remains the veriest quack, be he ever so skillful a manipulator. Neither can we neglect the administration of drugs, for by these we supplement our surgical means of cure, and in very many cases this means of cure stands first in the list of remedies, the surgical being inapplicable or holding a subordinate position. In the years past it has been the reproach of the specialists that their practitioners failed in the handling of drugs. Why? Simply because they were not good, patient, medical students, and had not learned sufficiently well the virtue of drugs, nor gained the ability to diagnose with sufficient clearness the pathological states to which they were applicable. This was true among occulists, and has been especially true among dentists. Let me express the hope that before each of you go out of this institution to practice your specialty, you may be prepared to do your full share towards the banishment of this reproach. Very much of the time of the dentist must,in the very nature of the diseases he is called upon to treat, be given to delicate and tedious manipulations, and it should be the aim of every dental student to become very proficient in this branch of his art; but in doing this he must not neglect the close study of disease, and the remedial virtue of drugs. Young men are too apt to be carried away by the brilliancy of splendid operations, and neglect studies that are of more intrinsic value. Although so much of the time of the dentist is occupied with manipulations, he should *know first, do second.* The future reputation of each one of you will depend more upon what you have in your mind, than upon what you can do with your fingers. The specialty in medicine grows up to meet the want felt by the people. It cannot be founded upon the desire of the individual. It is the people whom we all serve, and within certain limits we must so shape our lines of practice as to meet these needs if we would be successful. This does not consist however, in a slavish obedience to the popular will. The specialist should not lose his individuality and be turned aside by the false views or whims of those whom he serves. It is rather his business to obtain such a knowledge of the needs of those who consult him, and rise to such a degree of individuality and firmness of character, that he may have the power to control his patients and lead them into that course and action that will best meet their needs in each individual case. Here the specialist is not only the dexterous operator, but also becomes the teacher, and must by his council and advice lead the erring into such habits of life as will best promote their physical and mental welfare, and prevent the occurrence of disease. Skill in this line of work is just as important to your future success as dexterity in manipulation.

Every young man in entering upon a profession which shall constitute his life work, is impelled to the choice by some motive more or less strong. We take it for granted that every young man has some object before him that he wishes to attain. Some will strive for wealth, and perhaps a large number start on their life work with this end in view. Others may desire fame more, and are anxious to build for themselves a name among men, believing that after this is attained a sufficiency of this world's goods will follow. Some of you may have chosen the dental profession with the idea that it will furnish you a living with less labor than other professions. And some of you may have made this choice with the idea that you possess the natural dexterity which renders you especially fitted for the delicate manipulations so much required in this specialty. So it is that some enter this profession from one motive and some from another; but all desire success, and we presume are willing to give their best efforts to secure the object sought. A firm determination of this nature is certainly to be commended in every student. After years of experience in this specialty and a fairly wide observation of men in other avocations, I may be presumed to know something of the proportionate returns for the mental and physical energies expended. The capital invested by the dentist is that which he lays up in his brains and hands. Of dollars and cents he needs but little, and that little can often be supplied by his friends. But in obtaining that store of knowledge which alone furnishes the capital that determines his success or failure, he must rely mainly upon his own industry and obtain it by patient toil. Friends may assist by placing the matter properly within his grasp, and let me say that the Faculty of this institution will devote their best energies to this work.

In my observation of men it has appeared that dentists have won for themselves as fair a share of this world's goods, when compared with the capital, knowledge and energy invested in the business, as has fallen to the lot of men in other pursuits. The dentist who is well fitted for practice, and has a fair personal address,rarely fails to make a reasonably good living. Some very well informed men fail, but it is usually to be explained by some mistake in location or equipment, but oftener from errors of personal conduct. Those who attain wealth rapidly are comparatively few in any profession, and dentistry is no exception to the general rule. Yet there are examples enough to show that the dentist may accumulate wealth with considerable rapidity; but, at the same time, it must be conceded that dentistry is not the profession for a man to chose whose principal desire is to obtain great wealth quickly. Those who enter this profession with the desire to attain great fame had about as well retire at once. But to those who wish to be known as men among men, and attain a good name in society as persons who are doing their full share for the welfare of the human race, I would say go directly forward with the course you have chosen. We want you with us, and can promise you that you will find ample room for development. Your opportunities for good will enlarge as you progress in your professional work, and an appreciative public will reward you. While dentistry may and does require of those who do their duty in its practice much hard and patient toil,and much that is discouraging at times, it has pleasant features. The dental practitioner if he manages his time wisely may have as many hours for undisturbed relaxation as the devotee of any other profession. It is rapidly becoming the custom of the members of this profession to establish their hours for office work, and have some time that they can call their own, in which they can go forward with such studies as may be desirable and pleasant, each one following his taste. Or the dentist can devote, if properly and temperately done, much time to the pleasures of society, cultivating friendships, giving and receiving visits If his tastes incline him in that direction, he can give much attention to the study of science, art and literature. Let me say also that directly in the line of his profession there is yet a rich field open to exploration and discovery. The dentist, or indeed any other medical man, be he general practitioner or specialist, need not want for fields of research for many generations to come. No field of research has been more enriched than ours during the present century, and the prospect for finding other and still more brilliant treasures in the years to come is brighter than ever before. It is entirely unnecessary that I point toward special fields that are now in sight. A sufficient number of them will rise up in the path of the earnest student, and his time may be well spent in legitimate lines of investigation that will give a rich reward to his diligence and perseverance.

In your work while here in this College, the Faculty will expect of you punctual attendance on the several lectures, and constant diligence in the Infirmary and Laboratory. You will have but little time to play during your course here. The time required of you is very short when considered with reference to the work you are expected to accomplish. Indeed many of us who have been long in this field of work feel that it is much too short, yet the work seems to be demanded within the time set apart, and it will be your duty to make the best possible use of it. In the meantime, the several members of the Faculty will do their best to excel you in their promptness and devotion to their part of the work.

GOLD FOR FILLING TEETH.

BY W. O. KULP, D. D. S., DAVENPORT, IOWA.

Read before the Iowa State Dental Society, May, 1884.

The subject of filling teeth with gold has been discussed and *cussed* for more than fifty years, in journals and in societies, by the dental chair and in private conversation, until we can well say; what more can be said, what more can learned?

In fact, this subject has a strange power of infatuation.

The student does not become so enthusiastic over any other part of his professional acquirements as when he sees his first glittering contour gold filling. He will call up the entire class, individually, and show off his triumph, and he will at once strike a cord of sympathy in the minds of all. It is not a strange thing to see a young and even an old operator so absorbed in a fine gold filling that he will not notice hunger or weariness; in short, the amount of untiring energy put forth uncomplainingly with this class of operators is simply amazing. What would become of our specialty if it were not for this stimulus? I fear it would finally sink into a sort of humdrum, don't care calling. For my own part, I believe I would hardly care to remain in the profession if I were forbidden to fill teeth with gold. But is this stimulating impetus the only reason why we advocate filling teeth with gold? I answer not by any means. After an experience reaching over twenty-five years in attempting to save teeth by filling with gold, and during that time giving due experimentation to all other materials that have been thrust before us, I must give my testimony to-day, most emphatically, in favor of gold, as being the most absolutely perfect material (with the single exception of color) yet given to the profession, as a means of restoring and preserving decayed teeth.

Let us see what is necessary in a material to be used for this purpose:

1. Purity. Not liable to affect the general health, by giving off particles of its own substance; not to be affected chemically by coming in contact with food or medicinal agents, and thus combining and giving off an injurious *element.*

2. Adaptability to the walls of the cavity so as to effectually exclude air and moisture from the cavity.

3. Imperishableness. Able to endure mechanical friction and be insoluble in the secretions of the mouth, or chemical agents taken into the mouth. Gold has all the above qualities in completeness.

4. In color of tooth structure it is a failure; still, a well finished, soft gold filling kept clean does not look badly, much better than any other durable material yet given us.

As to its electrical harmony with dentine or tooth substance, I have no sympathy with the position taken by the advocates of the new departure on this point, my experience and observation never having revealed any such condition assumed by them to have been discovered. Neither do I believe that gold and amalgam or other material when put into the same tooth and in the same cavity do any harm to each other, or the patient, or the tooth substance. I have seen a great number of such cases doing well after many years' service.

I have special reference to repairing gold fillings with amalgam. I see such cases of repairing, after over twenty years' service, still in perfect condition, even in teeth that were considered at the time of repair too frail to again be filled with gold. Our limited knowledge of chemical laws and affinities often misleads us in our attempts to weave out some finely spun theories.

Hence, years of experience do not always agree with what some fellow has spun out and published in a book or pamphlet, or said at a society meeting.

I do not want to be understood as being an advocate for using mixed materials for filling teeth, but that I would not hesitate to repair a leaky gold filling in a molar or bicuspid with amalgam.

I do not intend this paper to be understood as advocating any new method of filling teeth with gold, but it may be of interest to some of the younger members of our society to listen to a review of the different modes of using gold for filling teeth.

1. Within my personal recollection gold was folded in strips of one-fourth to one-half leaf each, and sometimes whole leaves and even two and three leaves, if the cavity was very large, and then these strips were placed in the cavity, fold after fold, until it was about three-fourths full, when the folds were packed against the walls, instead of into the bottom, leaving the gold projecting enough to condense and still leave the cavity over full. This was about as difficult a method as any since employed, but made excellent work if well done.

2. Was what is called cylinder filling, where the gold folded as before, was rolled upon a broach, until it formed various sized cylinders. These were placed upright against the walls of the cavity until they were well protected, when the wedging process began from the centre of the filling in every direction, and more compact cylinders were placed in the space so made. This process continued until no more space could be made, when the filling was condensed with burnishers and finished. Many became quite expert in this manner of operating and many fillings put in after this mode may still be seen in the teeth of old people. I removed one the other day that had done good service for over forty years.

In this operation the stickiness of the gold, as it was then termed, was a serious objection. We often allowed the filling to get wet with saliva to overcome it. How often I feel like saying "fool that I was to puzzle and sweat trying to overcome what has since been my best friend! viz., the cohesive property of gold.

3. Came the nugget plan, which consisted in squaring the walls of the cavity as much as possible, and then folding and rolling gold foil into a hard mass, just a trifle smaller than the cavity to be filled, but about one-third higher than the depth of the cavity, thoroughly driving it home, depending on the battering out of the gold to fill the entire cavity, and leave a surplus for finishing off. In this operation I used the tack hammer (quietly) long before the mallet was in use! I was ready to say, God bless you! to Dr. Atkinson when he publicly advocated it in filling teeth.

Next came the sponge and cohesive gold era. In this era more teeth were wrecked and more suffering inflicted upon humanity than before or since. Not that I would be understood to say that no good work was done with cohesive gold—not by any means, for each have living specimens of success; but as a general rule making a hard ball of gold in a cavity was done at the sacrifice of thorough adaptation to the walls of the cavity, and thus many teeth were sacrificed, and many well-meaning men cursed by suffering patients. Gradually the older practitioners found that heavy foils did not save teeth as did some of our earlier operations with non-cohesive gold and lower numbers. One by one operators went back to Nos. 4 and 6 cohesive gold foil, and finally, to-day, there is more non-cohesive gold No. 5. used by the profession than ever before. This is made into pellets,balls, blocks, and ropes, and then annealed as it is used, thus making it as cohesive as desirable, as the work progresses towards contouring. Thus the old time method of filling cavities with soft non-cohesive gold, and the later one of building out with cohesive are combined until there seems to be no further room for improvement. We will find that this era will be called the successful one, as compared with all the past. As to the future, we must expect new things, new instruments and new modes of condensing gold. We have already found the true forms to be employed. If we can only find some way to get it into the cavities without so much pounding and hammering, our patients will call us blessed. Whether we can expect much of the

Herbst method is yet to be demonstrated; while at present I cannot see its possible adaptability in all cases, I believe it to be a step in the right direction, and that the time is not far distant when new light will be revealad to some one and hammering will be comparatively obsolete. That it may soon come the profession and suffering humanity will pray and ever pray.

TRANSLATIONS.

ON THE HISTOGENY AND HISTOLOGY OF THE DENTAL ORGAN.

FROM PROGRÉS DENTAIRE.

After all that has been written by excellent French and German authors on the histology and histogeny of the dental organ, it may perhaps appear superfluous to recur again to this subject. My only purpose is to collect in a few pages all that, up to the present time, is known of the development and structure of the tooth.

It is less an original work than a simple résumé.

PART I.

ORIGIN AND FORMATION OF THE TEETH.

Of the numerous phenomena of the human body, none, perhaps, is more curious and more interesting than that which concerns the development of the tooth. Obedient to certain laws of nature this development begins about the sixth week of uterine life with a perfect regularity, and continues to complete maturity, but in a manner so secret that the most minute investigations, undertaken to discover the means by which it was accomplished, had for a long time no result. Nevertheless, to-day we have seemingly arrived at sufficiently precise ideas of the progress of this development.

The teeth are developed progressively from minute papillæ, visible at a very early period of the fœtal life, and situated in a groove lined with mucous membrane and running around the alveolar border of each jaw. In proportion as they increase in volume, the papillæ take the form of the crowns of the various classes of teeth which they are respectively destined to produce. Having reached this period of their formation, they begin to undergo dentification, at first at the cutting edges of the incisors, the points of the canines and bicuspids and the tubercles of the molars; the process is then continued over the whole surface of their crowns until it has completely enveloped them. Thus it is that, layer by layer (the new formation being enveloped by that previously formed), the entire solidification of the teeth is accomplished.

Before this process has far advanced, however, the formation of the enamel is begun, and this operation is finished even before the dental pulp has become completely dentified. At the same time,and as it were in anticipation of the loss of the temporary teeth, there is formed a secondary series of teeth, and when the former are shed, they are promptly replaced by the permanent organs. Thus, by an admirable provision of nature, the first series of teeth, intended only to supply the wants of infancy, at a period when the jaws are too small to receive organs like those of the adult, disappears, to be replaced by a series larger, denser and more numerous.

At about the fifth month of uterine life new follicles, containing the rudiments of the permanent teeth, are already situated obliquely beneath the germs of the milk teeth. Later, these follicles fall back and down, and at the same time take a vertical position. Their ossification takes place little by little during the early years of life, although they still remain for a certain period connected with the temporary teeth by means of a minute, long and slim cord. This cord, known also to the ancient odontologist, is called by Delabarre "appendix to the dental matrix," and is generally named "ter dentis." The histogenic phenomena are the same for both dentitions.

The mode of development of the teeth, as I have thus briefly explained it, is admitted by all anatomists; but a grave question has been raised, bristling not only with difficulties but with controversies, and for which various solutions have successively been proposed; it is the question of the genesis of the different tissues that enter into the composition of the tooth. I do not pretend to resolve in a definitive manner a question so important and so difficult; I will only endeavor, with the aid of recent works of the best authors (yet without desiring to enter into the field of controversy) and with the examination of a few microscopic preparations which I have prepared with this intention, to make at least a little clearer this obscure portion of the animal histogeny.

The ancient authors attached no great importance to the knowledge of the first phases of the evolution of the tooth, which is the reason that this part, so beautiful and interesting, of the anatomy of its development has remained till to-day almost unknown. Nevertheless, we should not refrain from mentioning those of the ancient anatomists who occupied themselves with this subject; the first was Eustachius, who, in 1563, noticed the disposition of the teeth in the jaw before their eruption. Nevertheless, his investigations were limited to observations on the human jaw after birth, a period at which he claimed to have discovered, by skillful dissection, the incisors, the canines and three molars of the two sides of each maxillary, in a condition partly gelatinous and partly solidfiied. He discovered also the permanent incisors and canines behind the temporary teeth.

After Eustachius, others attacked the the subject: John Hunter, Jourdain, Blake, Fox, Serres, Delabarre and others, but their investigations threw no light upon it. The Englishman, Goodsir, has the merit of formulating a theory of the development of the teeth based on observations made upon embryos of six to seven weeks; if this theory has been overthrown in our days by the works of modern histologists, yet for a long time it held its ground in opposition to all others. According to the opinions of the more recent authors, the development of the tooth begins with the formation of the dental germ. This germ is composed of three distinct parts which are, according to the order of their appearance, the adamantine or enamel organ, the dental papilla and the dental sac.

The dental papilla which appears at the bottom of the dental sac, is composed of two parts: a median or axis formed of a connective substance containing vessels and nerves; an external, called also membrane of the ivory or dentine, formed by juxtaposed cellules, covering the central portion of the papilla after the manner of an epithelium, "dental cellules". Moreover, some authors describe a limiting exterior membrane, "the preformative membrane" of Rashkow, which separates the dental papilla from the enamel organ. This is not generally admitted, for the membrane in question appears to be simply an artificial product.

The enamel organ forms a sort of hood whose concavity caps the top of the dental papilla, and whose convexity meets the inner face of the dental sac. It follows from this that the enamel organ is composed of three layers: an external epithelial layer which on its face presents prominences with which the vascular excrescences of the dental sac engage. These villous projections, presented by the internal surface of the dental sac, were first described by English authors, Goodsir, Huxley, Todd and Bowman, and more recently and with greater exactness by Robin and Magitot. According to them, the villosities are pointed towards the superior face of the enamel organ, and correspond to the ordinary vascular papilæ of a mucous membrane. Soon after there is developed a capillary net work which receives the blood from the maxillary and the gum, and finally, the follicular walls disappearing, it forms vascular loops in the villosities before mentioned. Within the external layer lies the middle layer or pulp of the enamel, of a gelatinous appearance, whose internal cellules form the intermediary membrane of Hannover or matrix of the enamel; finally, there is the internal epithelial layer or enamel membrane.

The enamel organ and the dental germ are joined to the buccal epithelium by means of a prolongation called the gubernaculum dentis. Of the three parts thus forming the dental germ, that which appears first is, as we have said, the enamel organ. The mechanism of its formation is as follows:

From the eighth to the ninth week of inter-uterine life the buccal epithelium, which fills the dental grooves of the two maxillaries, is formed of three layers of cellules. Those of the first are pavimentous; those of the second, smaller and more rounded; and, finally, those of the third layer, cylindrical. At the moment of the formation of the dental germs the epithelium shows an elevation or ridge called by Kœlliker the dental crest.

At this stage the dental papilla begins to be formed, and appears as a bud, which, springing from the mucous tissue, is capped by the mucous portion of the enamel organ; we find also at this period the first traces of the dental sac, a simple condensation of connective tissue of the mucous derma around the enamel organ. At a more advacned period the cap of the enamel organ is fairly outlined. The cylindrical cellules which bounded its exterior have assumed different characteristics according as they are in contact with the sac or with the dental papilla. The former, which are the smaller, become pavimentous, and are covered with budlike prominences; the latter remain cylindrical, and constitute the enamel membrane. The rounded cells of the centre are gradually changed into a kind of mucous tissue without vessels, sown with star-shaped cellules, and form the enamel pulp. The innermost cells of this intermediary layer alone preserve their primitive character and form the intermediary membrane of Hannover. The pedicle which unites the enamel cap to the dental crest becomes then the true gubernaculum dentis. The enamel organ is therefore entirely of epithelial origin.

I have already said that the dental papilla is composed of two parts, an external and an internal; the external part is destined to produce the dentine which is developed at the expense of the cylindrical cells of its surface. These cells have spindle-shaped prolongations which are transformed into dental or Tomes' fibrils. Finally, in the midst of these fibrils, appears a homogeneous substance whose production is analogous to the intercellular or fundamental mass of the connective tissue. This intermediary substance undergoes diffuse calcification, transforming itself into a dentine or ivory. This transformation resembles greatly that of the osteoid tissue, so that we may say that there exists between them bonds of relationship. The walls of the dental canaliculi are formed at the expense of the layers of fundamental substance, and limit and envelop the fibrils of Tomes. The progress of this development is very difficult to follow. I will, however, endeavor to state all that in the present state of the science appears to me positive. According to Lent and other observers, the cellules of the dentine throw out little by little the filliform prolongations we have previously mentioned, and which attain a considerable length; these prolongations finally anastomose by means of their branches, preparing thus the way for the dental canalculi. Ordinarily each cell has but one prolongation, yet some of them have two. The calcification of which we have spoken above begins at the summit of the germ of the dentine, in the form of one or of several thin plates, separate, and known as the dentinal cap. This calcified layer covers, little by little, the germ of the dentine, spreading over its sides, from above downwards, and from within outwards.

At the time when this calcification is beginning, the vascular network, which is found at the centre or axis of the dental papilla, attains its entire development. At the same time, the cellules of the dentine, situated beneath its summit, undergo the changes experienced by their predecessors; that is to say, they become transformed into Tomes' fibrils with the dental canalculi and the fundamental substance. This latter soon undergoes a new calcification, from which it results that the germ of the dentine, always smaller. is extended gradually in length. This extension of the germ of the dentine gives rise to successive formations of the root, which undergoes at all points changes identical with those of the crown, changing into dentine and becoming calcified at the periphery. From this it follows that the portion of the dental papilla which is not transformed into dentine, constitutes the dental pulp.

After the appearance of the dentine, each disk of dentine is covered with a minute cap of enamel. The production of énamel takes place between the dentine and the enamel membrane; consequently beneath this membrane, by a mechanism still obscure.

Each enamel prism seems to correspond to a cylindrical cellule of the enamel organ; these cellules are calcified from the centre to the periphery, and the transformed cellules are replaced by new cylindrical cellules proceeding from the intermediary membrane of Hannover-cellules destined to calcify in their turn. The deposits of the layers of enamel are made then from the interior to the exterior ; consequently, in a contrary direction to the deposits of ivory. The pulp of the enamel insensibly disappears and the external membrane of the enamel organ constitutes the enamel cuticle.

The cement which covers the root of the tooth is formed, as are the periosteal deposits of the bones, at the expense of the internal wall of the sac which becomes the alveolo-dental periosteum. The production of the cement precedes but slightly the eruption of the teeth. In confirmation of what I have said of the origin and the formation of the teeth, I think it useful to reproduce here the conclusions to which Legros and Magitot arrived some years ago.

1. The first trace of the dental follicles appears in the form of a cord, arising from the epithelial layer of the mucous membrane of the gum.

2. The cord which gives origin to the follicles of the first dentition springs directly from prolongation of the buccal epithelium. The cord of the permanent teeth which succeeds the former is a diverticulum from the primitive cord. As for the follicles of those permanent teeth that are not preceded by corresponding temporary teeth, they spring either from the mucous membrane or from the cord of the preceding molar, according to the kind of tooth.

3. Whatever its point of origin, the cord is invariably epithelial; it is composed at the periphery, of the prismatic elements of the layer of Malpighi (the rete mucosum), and of the polyhedric epithelial cells at the centre.

4. The extremity of the cord, which soon takes the bud-like form, constitutes the organ of the future follicle.

5. The dental bulb appears spontaneously in the midst of the embryonal tissue, and covers directly the curve of the epithelial cord.

6. The enamel organ and the bulb cover and model themselves one upon another; the first serving as cap for the second, relations which are found at all periods of their evolution which precede the appearance of the dentine and of the enamel; that is to say, of the future crown.

7. The follicular wall is the direct emanation from the bulb, from which it detaches itself to rise on the sides as far as the summit of the follicle, where, joining itself again to the wall, it constitutes the follicular sac.

8. The rupture of the epithelial cord corresponds to the closure of the follicle, and from this moment the follicle loses all connection with the mucous membrane. The follicular formation is then free.

9. The evolutional phenomena of the follicles, to whichever dentition they belong, are identical in their nature. The only differences that exist are at the exact point of the origin of the epithelial cord, and in the time which the successive phases of their evolution require for the accomplishment.

10. The mode of genesis of the follicle of the tooth and that of the hair-producing follicle are identical.

ERUPTION OF THE TEMPORARY TEETH.

When the crown of the tooth is completely formed and covered with enamel (which is the condition of things at birth) and when the root which is growing longer touches the bottom of the alveolus, the tooth, which is arrested by this impassable barrier, is necessarily carried slowly and by degrees towards the gum, by the fact of its natural growth.

The most diverse opinions have been given on the mechanism of the eruption of the teeth. Some authors attribute it to the lengthening of the root; others to the pressure of the alveolus upon the root, driving the tooth towards the gum; others to a mechanical action of the crown which destroys the tissues lying beneath it. Finally the elder Delabarre compares the eruption of the tooth to the birth of a child. According to him, it is the dental sac adherent to the gum at one portion and to the neck of the tooth at another which, by its contraction, is the principal agent of the sortie of the tooth across the dilated orifice of the sac.

In the face of such hypothesis, I will only say, with the majority of physiologists, that the principal cause of the eruption of the teeth is solely the gradual pressure which the completely developed tooth exercises on the enamel organ and on the summit of the follicule, which soon give way, as well as the portion of the gum that covers them. As to the order of the appearance of the teeth beyond the gum, although no rule can be stated which will always hold good, I will nevertheless give a rough statement thereof.

According to many authors, the milk teeth erupt in groups and in a pretty regular order, the first comprising the two inferior central incisors, the second the superior incisors—the centrals first, then the laterals; therefore, when a child has six teeth, he has four above and two below. A third group comprises the two inferior lateral incisors and the four first molars. A fourth, the four cuspids or canines, and finally a fifth group, the four second molars. This order must not be considered as absolute, for there are many exceptions. The superior central incisors, for instance, may appear first, and sometimes their eruption takes place at the same time with that of the inferior incisors; at other times, the evolution of the first molars precedes that of the superior incisors. Bnt these exceptions are rare, and the order of eruption given above may be regarded as the rule. As for the period when the eruption of teeth occurs, it is difficult to place it with any accuracy. Children are sometimes born with teeth, while others do not get their first tooth till about the twentieth month or even later. Between these two extremes, there are found every variety of intermediate epochs. In a general way, it may be said that the first tooth appears about the seventh month of the infantile life.

LOSS OF THE TEMPORARY AND ERUPTION OF THE PERMANENT TEETH.

At the epoch of the complete evolution of the temporary teeth, the permanent teeth which are to replace them already exist in the jaws. They are arranged in a manner sufficiently regular, but different, according to the kind of teeth. If we examine at the the proper time a young jaw, there will be noticed behind each temporary incisor and canine, a minute point to which the name, *iter dentis*, has been given, because it indicates the spot from which will issue the permanent tooth. This point is the termination of the fibrous and vascular cord (*gubernaculum dentis*) which joins the follicular envelope of the permanent tooth to the neck of the corresponding temporary tooth. The *iter dentis* exists also for the permanent bicuspids, which are to replace the temporary molars, but is placed beneath the crown and between their roots.

As for the *gubernaculum dentis*, it is made to play an important *role*, it being regarded as the principal agent which guides the tooth during its process of eruption. The fact is true, but the diverse explanations which have been given seem to us far from conclusive. The gubernaculum, indeed, gives the tooth its direction, but not by drawing it as would a cord which contracts upon itself, or indeed by its dilation affording the tooth a passage as some authors have thought. According to a distinguished author, it acts by yielding its place in proportion as it fulfills its absorbent function, and perishes by a sort of self-destruction. In fact, we have seen in our account of the first dentition, that this cord (gubernaculum) was only the prolongation of the dental follicle, and that it was metamorphosed into an absorbing body (fungus of Delabarre), destined to open a passage to the erupting tooth. The same is the case for the second dentition. This fungus, which is still more voluminous, destroys little by little, as it forms, the parts in its neighborhood and, among others, the alveolus and the root of the corresponding tooth, thus making a place for the tooth beneath the fungus. The alveolo-dental periosteum, as well as the pulp of the temporary tooth, which is about to fall, become themselves parts of the absorbent body, and the root disappears, leaving its crown all ready to be detached.

Notwithstanding the authority of such authors as Delabarre, Fox and Bell, who have supported this opinion, I believe there is no necessity for the fungus of Delabarre to explain the mechanism of the loss of the temporary teeth and the coming of permanent ones.

The germs of the permanent teeth are, as I have already said, situated behind those of the milk teeth, and make their appearance the third month of uterine life. As the germs increase in size, they compress the vessels and nerves of the milk teeth, and, thus arresting their development, finally lift them and force them from their sockets.

Such, it seems to me, is the mechanism of the eruption of the permanent and the loss of the temporary teeth in their normal state. But it may happen that the germ of the permanent tooth is not situated where it should be, which we have previously pointed out; then the pressure by the coming tooth upon the milk tooth does not take place, and the two teeth exist the at same time in the jaw. In this manner are produced irregularities, and sometimes even a double denture, with a deformity more or less pronounced.

The teeth of the second dentition,properly so-called (the molars), erupt exactly in the same manner as those of the first dentition. The shedding of the temporary, as a rule, follows the exact order of their eruption. When the teeth of one group have been shed, there is allowed time enough, before the loss of another group, for the corresponding permanent teeth to take their positions. The eruption of the teeth of the second dentition begins almost always about the sixth or seventh year and is completed at from the twenty-second to the twenty-fifth year.

[TO BE CONTINUED.]

SELECTIONS.

CAUSES OF DISCOLORATION IN GOLD FILLINGS IN TEETH.

BY WILLIAM HERBERT ROLLINS, D. D. S.

As pure gold is not supposed to discolor, the causes must be other substances which may be introduced in one or more of several ways: they may be present in or on the gold foil when received from the makers; they may be present in the mouth itself.

The best way to begin the investigation was evidently to collect the discolored portions of fillings and analyze them. As yet no satisfactory result has been reached in this way, because the quantities were too minute.

The fillings themselves were next examined. Iron, silver, tin, and mercury were found. In which of the ways mentioned did these metals get into the fillings? The first attempts made to answer this question were to get samples of gold foil from the prominent makers, number them, and send them to Dr. Hills, of the Harvard Medical School, to be analyzed. The results of these analyses showed that none of the samples were pure. This was unexpected, as the makers guarantee their foils to be one thousand fine, or absolutely pure. Silver was found in every sample and iron in some. Extensive analyses made by the same chemist a year later showed the same results. The gold prepared by R. S. Williams always contained the least impurities. As the gold when received from the makers was always found impure, a short description of the manufacture may be of value as showing how impurities may be introduced.

The gold out of which foil is made is the mint gold, containing about two parts in a thousand of impurities. The makers dissolve this in aqua regia, filter, precipitate with ferrous sulphate, or more rarely with oxalic acid, wash the precipitate, melt it, and after casting, roll to ribbons between steel cylinders. It is then beaten to the required thickness between pieces of glued skin, which are never clean.

Gold in this form I shall call plain foil, to distinguish it from the forms in use. Plain foil is not in the market. It must be obtained by special order. To get this plain foil into the numerous varieties required by those who fill teeth, it passes through several processes and then becomes soft gold, cohesive gold, gold cylinders, gold blocks, gold pellets, etc., etc.; indeed one maker advertises over fifty varieties.

Cohesive Gold. Plain foil is heated (usually on an iron plate).

Soft Gold. I am not sure how this is made, as makers of foil have their secrets, but as surface impurities have been found on this kind of foil it is probable that, in some cases, the softness is due to those impurities which prevent two surfaces of this gold from uniting, and thus produce the so-called softness.

Corrugated Foil. Alternate sheets of gold and thin paper are made into a pile, placed between two pieces of iron and heated in a furnace till the paper is consumed. The sheets of gold are then separated, the ash of the paper removed as much as possible, after which the leaves are placed in books, or used in the manufacture of gold blocks, gold cylinders, gold ribbons, etc., etc.

Gold Blocks, Gold Cylinders, etc. These are the forms of gold in most general use. To make them the foil (usually the corrugated kind) is subjected to various rolling, pressing, and cutting processes by iron machinery.

This brief description of the manner of making gold for dental use enables us to see how easily impurities may be present in the finished product.

Silver, which is always present in the gold before refining, is almost sure to be present after the process, through careless manipulation and poor acids. Iron is likely to be introduced from the ferrous sulphate, from the mould, from the steel rollers, from the plates on which the gold is heated,from the hands,from the machinery used to form it into pellets, cylinders, etc. Other impurities are almost certain to come from the skins used in beating, from the paper used in corrugating, and from the dust of the shop.

To test whether impurities could be introduced by a careful person in making fillings, the following experiments were tried. The foil used was plain foil, and contained no impurities except a small amount of silver, as shown by a very careful analysis by Dr. Hills:—

First experiment. The foil was prepared in the ordinary way, as follows: It was cut with steel scissors, heated on iron, handled with steel tweezers, condensed with serrated steel pluggers, burnished with a steel burnisher. Dr. Hill's analysis showed that iron was present in these fillings.

Second experiment. The same foil was treated as before, only iridium instruments, made by the American Iridium Company of Cincinnati, were used instead of steel. Iron was found in these fillings.

Third experiment. The same foil was cut with bamboo, handled with gold tweezers, heated on platinum and condensed with iridium points, and burnished with an agate burnisher. No iron was found in these fillings.

This brief description can give no idea of the amount of care and time which has been spent on these investigations. I give a short abstract from one of Hill's reports, but even this conveys no adequate idea of the amount of delicate work in the analyses:—

"It is proper that I should state that great pains have been taken in the analyses to arrive at correct results. In the beginning great difficulty was experienced in obtaining chemicals of the requisite purity, and it was only after considerable time and trouble that acids absolutely pure were secured. In order to make certain that, if any of the metals tested for were found, they were contained in the gold itself, blank analyses were made before each analysis of the gold, using the same apparatus and chemicals."

Thus far the only metals whose presence we have accounted for are iron and silver. The next question which arises is, How came the tin and mercury in the fillings in which they were found?

Almost every dentist now uses amalgam in greater or less quantity. This remains on the instruments in minute amounts, often invisible; and when, by accident or otherwise, the same burnishers perhaps are used in making a gold filling, a little of the amalgam gets upon the surface, showing itself after a time as a discolored filling. That this is a frequent cause of discoloration I have no doubt, and only by performing all amalgam operations in another room with an entirely separate set of instruments can we hope to get rid of the trouble. As an illustration, I should like to mention the following case: An amalgam filling had been made in the morning, the hands carefully washed, and other fillings of gold made before lunch. In the afternoon a large gold filling had been almost completed, but needed a little burnishing. The gold burnisher was moistened with soap and applied to the filling, which directly changed color. An examination of the burnisher showed the same trouble. For a long time I was unable to account for the mischief. At last it was traced to the soap, to which a little of the amalgam must have clung when the hands were washed in the morning after using the amalgam.

In the beginning of the paper three ways were suggested in which impurities might get into gold fillings. I have shown that in the first and second of these ways impurities are introduced, and with regard to the third way the following may be said: Certain medicines, as iron, when allowed to remain in contact with the teeth, cause a discoloration of the debris which collects about the fillings and on their surfaces. In the mouths of those who smoke, the deposits of epithelial cells mixed with lime and germs which collect about imperfectly cleaned fillings become darkened. This discoloration makes fillings in some cases almost black. Discolored fillings are due to many different causes, as I have shown. In conclusion, the following suggestions, if faithfully carried out, will do away with some of these causes:—

Demand purer gold from the makers. Use this in the form of plain foil, because this is least liable to contamination.

Never touch gold foil with steel instruments of any kind. If it is necessary to heat the gold, do this on platinum.

Keep a separate set of instruments for amalgam. Insist upon a thorough cleaning of the mouth every time food or medicines are taken.—*Boston Med. and Surg. Journal.*

DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION.

TWENTY-FOURTH ANNUAL MEETING AT SARATOGA.

Reported for the ARCHIVES OF DENTISTRY by Prof. Chas. Mayr.

(Continued from page 422.)

WEDNESDAY, AUGUST 6, 1884.

MORNING SESSION.

The meeting was called to order at 10 o'clock A., M.; President Darby in the chair. The privileges of the floor were voted to Prof. Chas. Mayr, of Springfield, Mass., and to Drs. Bazin, Lovejoy, Borden and Andres, of Montreal.

The discussion of the paper by Dr. Harlan, upon Pyorrhœa Alveolaris, was declared in order.

Dr. Shepard.—Hoped that speakers would be exact in their expressions. He himself had said yesterday, "dilute sulphuric acid.'' That was inexact. He should have given the strength. He intended to have added, "in the proportion of one part of sulphuric acid to three of water."

Dr. Atkinson.— If the speaker meant one part of acid to three of water, that would be much stronger than the tincture of *aromatic* sulphuric acid.

Dr. Shepard.—I meant aromatic sulphuric acid.

Dr. Atkinson.—Then the gentleman was not exact when demanding that others should be.

Dr. Searle.—I like to ask the questions, why and what. In the first place, why do we use these various remedies? I think we have not gone deep enough into the nature of the disease. We hear it said sometimes that decalcification and caries are synonymous; also pyorrhœa and decalcification. They are both diseases of the soft tissues. The lime salts have nothing to do with them. If I have rightly studied pyorrhœa, I should declare it a disease of the pericementum. Originally it is set in action by some irritant, and that irritant may be tartar, lower organisms, or mechanical irritation;

but whatever may be the cause, the disease starts in the pericementum, and works itself far down between the alveolus and the cementum before it makes itself manifest at all. The disease has been operating, usually, for a long time before we notice it, and, unless we can apply our remedies to the special part affected by the disease, we might just as well throw them on the sidewalk. We all know that ptyalism and the various affections of the mucous membrane are not pyorrhœa. We know that inflammation is not the disease in question until it progresses to a certain stage. Now, where does pyorrhœa commence? We cannot define exactly at what point of the inflammation of the peridental membrane the disease commences, but probably during the stage when the pericementum itself becomes involved in the disease. To cure the disease we have to remove all foreign matter; we must go down to the point of union between healthy and diseased tissue and treat it as a disease, not as an injury. How shall we treat it? After removal of foreign matter we dress it like any other wound, as nearly antiseptically as possible; whether it is a germ disease or not I do not know, but in some cases it may be, and deserves as much an antiseptic treatment as any similar disease. The best antiseptic dressing I am acquainted with is carbolic acid, full strength, applied, as stated last night, far down to the point of union between the diseased and healthy tissue. What more can you do? The teeth cannot rest; you cannot apply a plaster as to an ulcer of the skin; in ulcers around teeth the carbolic acid itself will form a coating by coagulation, which will keep out extraneous matter. How about repeating the treatment every few days? I would say let it alone, most severely. Having once performed an operation, amputated a limb and dressed it, let it get well alone; give nature a chance; do not disturb it. Somebody spoke of the application of external friction; this, I think, is perhaps the best way of removing food, foreign substances, etc, that lodge accidentally between the alveolus and the roots of the teeth. Let your patient place the finger low down and move it up so as to compress the tissues, and then rinse the mouth with a bucketful of water.

Dr. Stockton.—It does not seem necessary to say any more about the subject, as any one who kept his ears open last evening evidently knows everything about it. One gentleman, very prominent in the profession, said it was caused by deposits, and could be cured by remedies; another said it was not caused by deposits, and could not be cured by remedies; one said a saturated solution of an acid would cure it; the other said there was no such thing as a saturated solution. I do not know any more about it than I did before coming. I thank Dr. Harlan for his paper, and hope he will give us the etiology of the disease another year.

Dr. Hunt.—Considers the disease constitutional, and thinks people and tribes, who live simply in accordance with the laws of nature have better teeth than the inhabitants of so-called civilized countries. He also considers the disease one of the symptoms of urinary troubles, not the cause.

Dr. Searle.—Cases at which I have been pegging away for five or eight years have yielded in a short time to strong carbolic acid.

Dr. Pierce.—I did not mean to say that urinary calculus was the cause of pyorrhœa, but the systemic condition which is cause for one disease is also for the other. There are cases of pus in the alveolar socket, due to local causes; these removed, the disease will subside. Pyorrhœa is hereditary in many cases; I think if inquiries are made among patients, you will hear them tell that "father and mother lost their teeth in the same way;" "all the teeth of father and mother came out without decay, all sound," etc. I do not believe in the transmission of disease, but of tendencies to it.

Dr. Watkins.—Dr. Pierce thinks the disease cannot be cured; I would like to relate a case where, I think, I cured it. It was one of the lateral incisors, elongated, pressed out of position, surrounded with pus pockets everywhere except in one small space on the labial surface; the tooth was very loose; I examined it and found a very little tartar about half way up the root; I removed this and the border of the alveolus, which was necrosed; I applied aromatic sulphuric acid, full strength. A week afterwards the patient came again, and I found that I had overlooked a small spot; I treated this in the same manner, and dismissed the patient; this was three years ago, and the tooth is now sound in its socket.

Dr. Howe.—Exhibited a few instruments; one a syringe with a fine platinum tube, the other a scaler to remove deposits by pushing or pulling, and the sides shaped so as to scrape the diseased alveolus.

Dr. Harlan.—The difference between salivary calculus and pyorrhœa are great. In the first affection the pericementum has not been detached beyond the line of deposit. In any event the salivary deposit is all around the necks of the teeth, and continuous, not broken up into islands. The pericementum cannot be lifted from the root of the tooth beyond the line of salivary deposits. Whatever may be the initiative of pyorrhœa, if mechanical, chemical, traumatic, or anything else, it has a beginning at the gingival margin, on the ligament surrounding the neck of the tooth. It is believed, in connection with this injury, that micro-organisms of a peculiar form are found; that they manufacture a soluble ferment, which destroys the tissues in advance. If that theory be correct it is necessary that a remedy to destroy these micro-organisms should be injected. The reason for the frequent injection is, that the remedy you use may destroy the developing organisms, but not destroy the spores, so that in three or four days it would be necessary to repeat the injection and so on, until all spores have been destroyed. Dr. Black, of Jacksonville, has advocated this theory. It is no wonder that Dr. Pierce comes to the conclusion that the disease is not curable if he uses only one remedy which, as he himself says, cannot be applied in all cases. I have received hundreds of letters from all over the United States; I have visited the colleges, and their officers have told me they were trying the treatment I recommended. They have asked me to see the patients, and when I asked for the remedies and instruments to show how to manipulate the one and to use the others, they did not have them. How can a gentleman expect to accomplish anything unless he himself will faithfully try and be honest? It is no criticism against a method or treatment, if the criticizer himself does not practice or attempt to practice what is advocated.

Dr. Brown.—There seems to be two grounds taken in this discussion; the one that pyorrhœa can be cured, the other that it cannot. Now, let us take an intermediate ground. Who would think to condemn a physician because, when he cured a sore throat, it recurs in a year, nor, if any one had cured pyorrhœa alveolaris, and the disease reappeared in three or four years; the dentist takes generations of treatment to cure disease and eradicate it? The child says, "mother's teeth dropped out and sister's did; I come to you fearing the disease." The question is not whether it can be cured permanently. Dr. Harlan is right; he has cured cases; so have I, and so have we all; but can one tell what the cases will be five years hence? Many will recur. Does a man allow his wooden house to burn down because it caught fire three or four times, while his neighbor's stone house even burned?

Dr. Shepard.—From my observations I think the disease can be wiped out in the first generation. Taken in the incipient stages it is as curable as any disease; there will be no loss of the alveolar processes. Patients should bring their children to us in early life; the tendencies, as Dr. Pierce said, are hereditary. We need to watch them. The term pyorrhœa, meaning originally pus-flow, is used to mean the loss of tissue and the ensuing inflammation. The section of nomenclature has not been active in the proper direction.

Dr. Atkinson.—We have heard a great deal of good sense and of nonsense; some have classified diseases in the plural before they have defined them in the singular, and they have got so tangled in perception that we have had a hodge-podge of brilliant perceptions so intermingled as to be made worthless. Let us get our minds to the point of what a disease is, and how it acts, and whether it is capable of being limited or annihilated. There is such a thing as antidoting diseased activity which is the result of the introduction of foreign elements into the functioning body. Every phlegmonous abscess is self-limiting and self-curing. It will go in the direction of least resistance. If the flow of pabulum by pressure is prevented, it will abort. Why does not pyorrhœa alveolaris heal? It is the introduction of micro-organisms which float in the air that set up a ferment adverse to the formation of tissues, so that they can be built after the type of the tissue. I cured a case of twenty-four years standing in eight days. I then used wood creasote. What is recurrence? It is either repetition or imbecility on the part of the investigator, or malevolence by persisting in a wrong position. These cases of which we speak as recurrences are simply territories only inclosed a little, but not healed, in which the bacteria had sufficient oxygen to keep them alive, and they broke down the tissue, until it made its way by the recuperative law and broke through on to the surface or took another way of curing, which is encystment, whereby the foreign body becomes a mineral in its function, like a bullet in the body, remaining encysted for years. I have in my own person a splinter of wood that has become resorbed so much that I find it only occasionally. When you have removed the body inimical to the organization, that organization alone does the cure. Anything may be according to organization, a food, a poison, or a remedy. On motion the subject was passed.

[TO BE CONTINUED.]

BIBLIOGRAPHIC.

THE FORMATION OF POISONS BY MICRO-ORGANISMS. By G. V. Black, M. D., D. D. S. Philadelphia: P. Blakiston, Son & Co. 1884.

This work is devoted to an argument in favor of the germ theory of disease. It is arranged in the form of lectures, seven in number to which is added an appendix.

The first lecture comprises a brief history of the subject under consideration, and the discussion of the views of the earlier writers upon it.

The second lecture opens with a review of the theory put forth by Dr. Bastian relative to the de novo origin of life. This theory is remotely related to the germ theory of disease, but is sufficiently so to entitle it to notice, and for that reason it is considered in this work.

Dr. Bastian holds that the molecular movement theory, by being continued under favorable conditions, actually produces the living forms found in the culture fluids of Pasteur and other recent experimentalists. (This view is pretty generally disputed by other scientists, and, although a very large majority deny the correctness of Dr. Bastian's views the question still remains undetermined.—EDITOR.) The main subject is again resumed and the views of Schw ann, Latour, Pasteur, Lister, Billroth, Klebs, Virchow and others explained. In the third lecture the peculiar views of Dr. Beale are considered, followed by those of Koch and others, all of which leads our author to the conclusion that "All the foregoing taken together, gives strong presumptive evidence that all contagious and infectious diseases are produced by disease germs."

The fourth lecture considers "The Relation of Micro-Organisms to the Production of Disease." In the treatment of this branch of the subject the following propositions are presented "as a basis for a further study of the subject."

First, Experiment has shown there are many micro-organisms which do not produce disease; and that there are certain other micro-organisms that do induce disease when introduced into the bodies of men or animals.

Second, That poisons have originated in connection with these disease-producing organisms.

Third, That these poisons seem to be a product of the organisms and may be separated from them; and when so separated produce direct poisoning.

Fourth, "This poisoning is different from the disease induced by the organisms in that it is direct, and comparatively immediate, while infectious disease arises only after a more or less definite stage of incubation." And

Fifth, That probably "infectious disease is caused by a micro-organism that is capable of developing in the tissues, or blood, and forming poisons through changes wrought in the molecular forms of matter, by virtue of its vital energies; or, the physiological processes of digestion, nutrition and the formation of waste products."

Having shown the fact that micro-organisms are regularly connected with certain processes of disease and that these processes do not occur without their presence, this branch of the subject is disposed of as follows: "The Germ Theory of Disease, as it stands to-day, is essentially a mass of unexplained facts, developed by direct experiments of the most subtle nature; so subtle, indeed, that there are but few men who have the natural endowments necessary to verify them.

Then follows a brief discussion of the subject of digestion, including absorption, nutrition and the formation of waste products.

The action of ferments is carried forward to the assimilation of nutrition by the tissues themselves.

In the fifth lecture the same subject is continued under the heads of Resorptive Digestion, Digestion of Blood-clot, Digestion of ligatures, of sponge, etc.

In the Sixth lecture, Waste Products are considered with reference to the germ theory of disease, and in the Seventh, Poisons and the manner in which low organisms produce disease.

The Appendix is devoted to the consideration of Dental Caries and Its Relation to the Germ Theory of Disease.

Our space forbids little more than a simple enumeration of the chief topics treated of in this notable volume. That it offers much food for thought is but a tame expression of the value of its contents. The book is a continuous argument and must be read by all who desire to gain an intelligent perception of the views put forth, and of the testimony adduced in their support.

EDITORIAL.

The translation of the article from *Le Progres Dentaire*, Part I. of which is presented in this issue of the ARCHIVES on "The Histogeny and Histology of the Dental Organ" is by Professor Chandler, of Boston, whose previous work in this direction has hardly received the recognition from the profession which its merit demands. The addition of his name to the corps under whose management the ARCHIVES will be conducted, under the new regimé, is a guarantee to our readers that they will from time to time be presented with translations from the French and German of whatever is most valuable in our contemporary professional literature. The author of the paper under consideration makes, as will be seen, little claim for originality, As a resumé of all that is known upon this subject in England, and upon the Continent, its appearance here is at a very opportune time. Our readers will be able to compare it with the recent contributions to the literature of this subject by our American writers. The absence of illustration, so essential in work of this kind, makes necessary some familiarity with the subject in order to fully appreciate the value of the paper. As a mass presentation, it could hardly be expected that the author would enter into minute details at any very considerable length, but the salient features are, nevertheless, very clearly brought out.

There are several points in the paper not altogether in harmony with what we believe has recently been very clearly demonstrated by our American writers upon this subject. The author speaks of the teeth in the opening of his paper as developed progressively from minute papillæ situated in a groove lined with mucous membrane. It has been shown that the teeth are developed in a closed sac situated *beneath* the mucous membrane and, after the breaking up of the epithelial cord, the *gubernaculum dentis* of the author, which occurs in the early stages of development. According to the most recent observations, this sac, inclosing the developing tooth-germ, has no direct connection with the mucous membrane, until just previous to the eruption of the tooth, or about the time of the completion of the formation of the cementum, when the pericementum becomes united to, or continuous with the gum tissue surrounding the tooth. The author does not seem to have very clear ideas of the process of absorption of the roots of the temporary teeth. Upon this point we think the recent contributions of Professor Abbott and Dr. Williams much clearer and more satisfactory. There are other points, of which mention may be made, as the origin of the *persistent capsule* of Nasmyth, and the termination of the nerve fibers of the pulp, which are open to criticism, but, on the whole, the paper is well worth careful perusal. The latter points are contained in Part II of the article which will appear in the December number.

THE

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ORIGINAL ARTICLES.

"Of all the arts in which the wise excel,
Nature's chief masterpiece is writing well."

A SYSTEM OF TREATMENT FOR EXPOSED PULPS.

BY A. H. BEST, M. D., L. D. S. R. C. S. I.

If there is a condition that more than another is calculated to disturb the equilibrium of a dentist's mind it is that of exposed pulps. The multiplicity of circumstances which surround these cases, and which are more often of a detrimental character than otherwise, frequently evade the grasp of the average practitioner, and failure is the almost inevitable result.

An excedingly troublesome source of misunderstanding, which in large measure contributes to such failures, consists in the unsettled manner in which certain observations are made, conjoined with the arbitrary way in which the results are classed. It is not at all rare to find an operation rated as perfectly successful which might be more correctly characterized as the reverse. I may say in this connection that in our profession as in every other, there are a number of well-intentioned people who have a fashion of describing everything that they undertake as "a success." This peculiarity is not always to be attributed to a desire to appear of superior manipulative ability to their neighbors; there is probably in most cases an honest intention, which innocently leads to representations that are unsupported by a correct judgment as to what is and what is not success.

I have seen from time to time articles on the subject herein treated, and recall to mind such passages as the following, (I quote from memory):

"After the rubber dam was adjusted, which we invariably do in these cases, the cavity was made perfectly dry, after which we removed the carious portion of the tooth structure, leaving that portion of caries that covered the pulp intact, so as not to expose the pulp. We then took a small piece of cork, shaved thin, saturated it with carbolic acid, applied it directly over the pulp as a capping, and filled with amalgam, etc. The operation was a perfect success, the patient not having experienced the slightest pain, either during the operation or after the dam was removed."

Now I think I can unhesitatingly say that such declarations as the foregoing plainly show a deficiency of practical judgment, a lack of powers of observation, or a non-appreciation of the ends desired. It is quite probable that there is scarcely a dentist of any practical experience whatever who has not often seen a perfectly exposed pulp, causing no pain whatever, unless touched or irritated; but was the absence of hyperesthesia in such a case, evidence that the pathological condition was all that could be desired? I apprehend no one will pretend that such was the case, yet this tooth, barring the filling, is in the same condition as that one above described after the operation which was declared a perfect success.

A curious fact concerning the novel writers of the world has often claimed my attention; it is that nearly or quite one half of these writers are philosophical observers, determined investigators of abstrusesocial problems, while the other half possess no powers of individual observation, but are earnest and attentive students of the first half with an original manner of dealing with abstract and deduced principles. What is true in one branch of literature may be assumed to exist, more or less distinctly observable, throughout the whole, and dentistry can certainly not demonstrate any exception to this rule in her favor, considering that every science appears subject to it.

I have noted in the writings of some of our best and most successful practitioners, that they invariably leave a layer of decayed dentine over the pulp rather than expose it to the contact of foreign material. But however good this theory may appear, and no matter how flattering may be its success in the hands of an expert, it is pernicious. Either these gentlemen do not do what they recommend, or if they really do it, their ideas with reference to the decayed portion permitted to remain are such that the average practitioner cannot grasp them, for what the latter would call a layer of decayed dentine, and would therefore propose to leave over the pulp, the former would undoubtedly condemn and remove as superfluous and detrimental, while vice versa, what the former would call a layer of carious dentine, the latter would be willing to declare was absolutely healthy tooth structure, only perhaps slightly discolored. Thus we perceive that two conditions, one comparatively harmless, the other directly opposite, would be spoken of by the different operators producing them, as one and the same; and the actual difference could not become apparent unless the cases were presented for comparison.

We all know that some dentists do better work than others, and yet those below the standard are not to be hastily accused of negligence, for personal observation assures us that they are, for the most part, earnest and determined workers; that they fail despite their best efforts. But why, then, is it so? There must be some reason, and since one does with ease what the other never can do, we are constrained to admit that some inaptitude affects the judgment of the latter.

Here, then is the key to the difficulty, this inability is a matter of judgment.

Each of us we hope is an earnest worker; failures must therefore in the majority of cases, arise from a want of judgment, of just appreciation of surrounding circumstances, of adaptation ofm eans to ends.

We are thus obliged to admit that circumstances which insure success are to be recognized and allowed for as well as those which indicate a failure, were certain operations attempted. The absence of those conditions which are invariably associated with unsuccessful operations does not warrant a prediction of success,which must be founded on the presence of all those qualities that are known to promote it. The conditions to be fulfilled will of course depend(1) upon the operator, (2) the patient, (3) the particular kind of operation, and (4) surrounding or accidental influences. No fixed rule can be laid down to be unswervingly followed, so as to avoid the exercise of judgment; each case is as surely and truly a law unto itself as it is possible for it to be, and success will attend the efforts of the operator in exact ratio to his appreciation of this fundamental truth. It matters little whether the dentist is adapting an artificial denture or filling over exposed pulps to save teeth; this principle must be adhered to for only by a skilful adaptation to the particular case in hand can real satisfaction be insured.

But it is only with exposed pulps, and the condition preceding that state, as consequent on caries, that we are at present concerned. It is a natural result of the action of caries that the pulp should be left protected by but a very thin septum of dentine; this condition, described by the epithet "almost exposed" is one that does not generally attract the notice of the average operator. Hence teeth of this description, after being filled, exhibit a most tormenting degree of thermal sensibility; a cup of hot tea or a glass of ice water excites a paroxysm of unbearable pain,which is fortunately of brief duration. This pain is more severe, and the sensitiveness to slight changes of temperature more marked in proportion as the stratum of dentine between the pulp and the metallic filling is reduced. This condition leads to one of two results; that is to say, either healthy action sets up in the pulp, which protects itself by a deposit of sound dentine, or the filling gives rise to so very much irritation as to cause inflammation and finally death of the pulp. In the former case the tooth is in a comparatively good condition until otherwise affected; in the latter alveolar abscess is the invariable result, and its appearance only a matter of time.

How to insure the first result? How to decide which is sensitive dentine, likely to take on healthy action after the filling is inserted, and which is the almost exposed pulp whose thin shield will transmit thermal changes with sufficient rapidity to excite the dangerous inflammation culminating in death of the pulp? And having drawn the line between the almost exposed and the actually exposed pulp so far as the diagnosis is concerned, how do the same as regards the treatment?

Let us suppose the pulp fully exposed; what then is the nature of this exposure? Is it quite recent, or of comparatively long standing? Is the pulp healthy or diseased? If the latter, to what extent? Does it seem amenable to treatment, or has the affection precluded all possibility of a return to health? In a word, what are the conditions? What is to be done? What is the best manner of doing it, and why? All these questions, and a hundred others, are constantly being presented, or should be, to the mind of every dentist; and the success of every dental operation naturally depends upon his capability to answer them correctly, that is, upon his more or less well-balanced judgment.

"Oh! my tooth! how it aches since I had it filled!" This phrase of lamentation goes up from thousands of tea-tables throughout the land every day. The universal appeal might well induce a philanthropist to ask "why does it ache?" The cause is plain: the operator has failed to recognize and take advantage of the special circumstences of the case, in the manner calculated to insure comfort and what we call "success;" or though he recognized them, he lacked practical ability. In the meantime, how much suffering results to the patient! "How my face is swelled, and such pains as I do have in my jaw and head!" "Indeed, is it so?" says a friend, "I can sympathize with you; but what does your dentist say?" "Oh! I just had my tooth filled last week, and he says I have caught cold in it, and have neuralgia. He told me not to take cold in it, but you see I did so after all, so I suppose it's my fault."

Another class of failures that constantly occur is occasioned by not treating with proper care the vital part of the tooth filled.

I have known cases where a patient presented himself for an operation, and, after the usual preliminary conversation, took his seat in the operating chair, when the following colloquy ensued: "This is the tooth I want to get filled"—"Oh yes, very large cavity" (says the doctor who is anxious to thoroughly impress that fact on the patient's mind); "I shouldn't wonder if the pulp is exposd; but we'll soon see." (He takes the syringe and injects a little cold water.) "What! no pain! really, I'm very much surprised; quite expected to find an exposed pulp. I will clean it out a little." (Uses his excavator; at first cautiously, then vigorously.) "Well, now! really you may congratulate yourself; the pulp is not exposed; I'm quite astonished, it is such a large cavity." He revolves in his mind the prospective fee, and says: "Well, I can fill that tooth for you immediately; did you wish it filled to-day?" Patient answers in the affirmative, but proposes to leave the matter to the better judgment of the doctor. "Since the pulp is not exposed," says that authority, "it had better be filled at once." The operation is accordingly accomplished, and for a week or so appears to have been a "success;" but clouds are hanging on the horizon, and soon there is unmistakable threatening of a storm. "My! what a pain in that tooth!" complains the luckless patient some morning at breakfast. "I could hardly sleep a wink last night on account of it. Then the tooth actually seems longer than my other teeth; it is very difficult to eat for I cannot close my teeth; and my face has begun to swell. I must away to my dentist at once." He finds his dentist "very busy but will give him a few minutes as soon as he can." The patient being a gentleman accustomed to good society, of course sits down and quietly waits until the doctor can see him. He explains his trouble to the D. D. S., who is overwhelmed with sympathy; the doctor is "very sorry, but it was a very large filling, and you have certainly taken cold in it, which has set up neuralgia." The patient hints that there may have been something wrong about the tooth that escaped observation on the first examination. But the doctor indignantly declares "that there was nothing wrong; there was no pulp exposed; and he wishes, as politely as possible, to inform his esteemed patient that he is a regular graduate of one of the oldest colleges in this country, and ought to know his business. The whole trouble is nothing but neuralgia, which will form a gum-boil, and get well," which prediction is usually verified, at least in part, i. e., the gum-boil.

Of course the very circumstance of the operator's not finding a very large cavity sensitive should have at once suggested the probable death of the pulp, a condition which could not be overlooked without entailing consequences sometimes still more disagreeable than those above described.

To many members of the dental profession these instances will seem overdrawn and exaggerated; the better class of operators will think such negligence beyond the pale of credibility; but there are those who have observed similar cases so often that the recital will have but little novelty for them. I do not wish to be understood as asserting that under all circumstances it is possible to avert unpleasant complications, such as neuralgia, or even abscess; on the contrary, these terminations are, unfortunately, sometimes unavoidable; they should, however, be the exception, and not the rule. In fact, when a tooth is properly treated by a skilled and observant practitioner, it is very rarely the case that any trouble arises. Success depends, for all that, upon so many considerations, that any lack of vigilance on the operator's part is only too likely to diminish the chances of preserving the tooth.

Actually exposed pulps may be spoken of as practically forming two classes, viz., those that can be saved, and those that cannot. The first division embraces pulps recently exposed, not inflamed, suppurating, nor sloughing; besides several cases exhibiting such symptoms as a consequence of irritation produced by extraordinary causes, combined with a vigorous constitution. The second division embraces those cases of exposure of the pulp and breaking down of the pulp chamber not comprehended in the first class; and in which absolute devitalization and extirpation appear essential to complete success, with such after treatment as the urgency of the case may demand. We will endeavor to confine our remarks to those conditions indicating conservative treatment, i. e., to the first class.

Simple cases of sensitive dentine require very simple but effecttive treatment, which contributes but little to the success of the operation as a mechanical result, but very largely to the comfort of the patient. Many operators do not attempt in any way to counteract the liability to pain from thermal changes; but others, and among these the better class of dentists, exercise every precaution for that purpose.

Some fill the bottom of the cavity with oxychloride of zinc, a most valuable material in the proper place, but inadmissible in cases of an exposed or almost exposed pulp; for while the oxychloride seems to exert a decidedly beneficial influence upon sensitive dentine in cavities, the escharotic action of the chloride of zinc appears to be exercised unchanged upon exposed pulp tissue, so as to destroy many pulps intended to be saved. For this reason, as well as on account of the pain attending the application of the oxychloride to exposed pulps or to sensitive dentine, many practitioners have entirely abandoned its use and rely solely on preparations that combine lack of conductivity with non-caustic properties.

For sensitive dentine, gutta-percha in one form or another is used with great success; but where pulps are almost or quite exposed, it is not safe to rely upon it; for the heat necessary in its manipulation, and the pressure necessary to make it cohere, are often too great for the delicate pulp-tissue, and produce the very irritation we seek to avoid.

A solution of gutta-percha in chloroform is however of great benefit in many cases in which the other forms of that material are not admissible. The delicacy with which it may be applied, even directly over exposed pulps, and its efficacy as a covering material render it a very desirable auxiliary in many cases where gentleness is as essential a feature of manipulation as thoroughness.

This solution is improved by a slight addition of "carbolic acid;" the same effect is obtainable by touching the exposed surface, after it has been made perfectly dry, with full strength solution of crystallized pure phenol, previous to coating with the solution of gutta-percha. The coagulation of soluble albumen in the animal fluids produced by this agent interposes a slight barrier between the still sensitive pulp and the gutta-percha. But even when the pulp is not exposed at all, there is still much benefit from the adoption of this course, from the sanative influence exercised by phenol upon diseased dentine.

The advantageous use of the solution of gutta percha in chloroform extends over all cases in which direct contact of a metallic filling material with exposed pulp or sensitive dentine will, it is feared, act as an irritant. In such cases a heavy and impervious coating may be easily interposed upon the floor of the cavity, and with proper precautions in the introduction of the filling material, the disagreeable results may be considered as effectually prevented. Cases of almost exposed pulp in which the injection of cold water produces intense pain, may also often be treated in a similar manner, with the advantage of comfort to the patient, and enhanced durability of the filling. It is well, after the coating of gutta percha has been applied and the chloroform has evaporated, to cap over the weaker part of the pulp-chamber with either oxyphosphate or oxychloride, mixed to the consistency of cream and gently flowed into position, being then allowed to set, without any pressure or packing.[1]

From what precedes it will appear that the solution of gutta-percha is a very valuable auxilliary, by means of which we are enabled to fill almost every kind of cavity, from a case of sensitive dentine to one of absolute exposed pulp, without incurring any grave risk.

For the treatment of sensitive dentine, a condition which, with the average practitioner, includes also that other which we have characterized as almost exposed pulp, many other methods are recommended, but all depend on preventing contact of filling and pulp-tissue, by interposing a thin stratum of some impervious material, a thin shaving of cork, a scrap of gold-beater's skin, lead foil, goose-quill, even cotton-wool, etc., all which expedients are in their way successful, but not with that kind of success which some of us would like always to see. We usually find teeth filled in this manner to appear very dark, indicating either the death of the pulp, decomposition of the protecting material, or both results at once; the filling nevertheless may remain, the tooth be moderately comfortable, though, oh! how unsightly!

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[1] Since writing the above, I find these suggestions, which were based solely on practical results to be substantiated by the experiments of Dr. Miller of Berlin.

I presume all are familiar with the Weston pulp caps, and know how efficient these little contrivances are when properly used. I am free to confess they have been of great service to me, being so convenient and handy. I adopted them as soon as they came out. Before that time, I employed the same idea the only difference being that mine were made of vulcanite. The method that yielded the largest number at least expense of labor and trouble may be worthy of insertion in this place.

Take one half of a flask, fill it up even with plaster of Paris, finish off smooth, then with a small hammer drive the whole surface full of small round-headed carpet tacks. Spread over the models thus prepared a very thin layer of wax, no thicker than paper; burnish over it a sheet of lead or thick tin-foil, taking care to bring out the heads as accurately as possible; the edges of this foil are then turned up so as to be caught in the plaster. The other part of the flask being now placed in position, plaster is poured in, in the same manner as if we were flasking a set of teeth. When the plaster has set, the entire flask is placed in the boiler, and opened when warm, and the wax gently scalded out with hot water; then pack with rubber, and vulcanize in the usual manner. The supply of caps thus obtained is of a size especially useful in many cases, and the trouble of making them is not comparable with the convenience they afford. They are not applicable to every cavity, but their form admits of much alteration, a circumstance that increases the range of their adaptability.

These caps are usually applied with the concave surface toward the pulp, precautions being taken that no part of the edge of the cap rests upon the sensitive organ it is intended to protect. It is of course highly necessary to satisfy one's self of the healthy condition of the pulp before, as it were, battening down the hatchways, and leaving it to work out its own salvation, or the reverse.

It is requisite to exclude the air from the space between the cap and the pulp; to this end the concavity of the cap is filled with some paste, usually a mass of oxide of zinc mixed with phenol-(carbolic acid). In my hands better results have attended the use of a mixture of phenol and Canada balsam, equal parts, with which just enough oxide of zinc is rubbed up to form a paste of creamy consistency; the concave part of the cap is filled with this paste, and the cap applied warm; after which the tooth is filled, and when the operation is conducted with due regard to the condition of the tooth, I can safely say that a greater percentage ot pulps may be saved by this than by the former application.

I was led to employ the balsam in this manner from a knowledge of the custom of the people who live among the pine forests of our Southern States. In these regions it is seldom that any other remedy is applied to fresh cuts or wounds besides fresh turpentine. This practice is so prevalent that it is hard to find a farm house in the rural districts, that does not possess a fresh "box" cut in some neighboring pine-tree solely for use in case of accidents of this character.

Their usual manner of applying the turpentine is to stop the blood in any convenient manner, more generally, perhaps, by compression on the wound with a dry cloth; they then dip the crude turpentine from the box, spread a thick layer over the wound, and apply over the entire surface a piece of cloth, thus improvising a kind of rude sticking plaster. This plaster is usually left in position until it falls off of itself,when the wound is found entirely healed and needing no further treatment.

A consideration of this practice led me to try the same, or at least a similar remedy in some cases of exposed pulp where the pulp had been accidentally wounded and had bled a drop or so. The first cases thus treated were cleansed of the blood immediately over the pulp; the cavity was dried with warm air from a syringe; a paper cap was cut to the size requisite to cover the floor of the cavity; this cap was held in the pliers, some distance over the flame of a spirit lamp,and the solid balsam brought in contact with the upper side of the cap, so that when it melted sufficient could be received on the paper to give an even coating over the whole surface. This cap was then applied, balsam next to the pulp, exactly as if one wished to apply a bit of sticking plaster. That the cap may be adjusted in position a small pledget of cotton saturated with phenol is employed to gently press it into place; the paper at the same time becoming saturated with the preservative, adapts itself to the cavity. Any excess of balsam oozes from beneath the pad, and is rendered easily removable by the acid. The cavity is wiped out carefully with bibulous paper; it is then ready for the filling which in these extreme cases should always be one of the white cements, mixed rather thin, flowed into position, and allowed to set without packing or pressure. This filling should be permitted to remain until we feel tolerably certain that the pulp has taken on healthy action: a period which ranges in different subjects, from three weeks to three months, and sometimes longer. If no symptoms of an unfavorable character manifest themselves, the tooth is assumed to be ready for excavating the temporary stopping and inserting a metallic filling; a delicate operation, but not difficult, and giving usually very satisfactory results when properly executed.

But if the tooth is intended to receive a permanent filling at once, without this preliminary treatment, a pulp-cap must be inserted to prevent pressure upon the pulp, and save that organ from the influence of thermal changes.

In cases of sensitive dentine, as well as that condition which I have styled almost exposed pulp, there is nothing in my experience that so fully meets the requirements as this paper cap, pasted in position, as it were, by Canada balsam. Even those cavities where there is scarcely depth enough to permit any other capping and yet retain the filling, may be made comfortable by this treatment, while nothing is detracted. I believe I have tried nearly every method, with a view not only to save teeth by filling, or preserve the life of pulps, but to make teeth so treated comfortable; and I can safely say that the treatment above explained has been as universally successful as the range of possibilities seems to permit; and I measure my successes, not by days or weeks, but by years.

A METHOD OF MOUNTING A PORCELAIN-FACED CROWN.

BY A. O. HUNT, D. D. S., IOWA CITY.

Read before the Iowa State Dental Society, May 1884.

One very important part of dental technics is that of crown setting.

There are many methods of doing this, some of which are very practical and easy of accomplishment when conditions are favorable.

When roots are crowded, the surrounding parts are subject to a class of diseases that are difficult to treat unless the pulp canal can be utilized, through which to pass the various therapeutic agents to be employed.

By the usual method of attaching a crown it is necessary to remove it whenever treatment is to be resorted to. Such removal means destruction to the crown; as one well adjusted will in nearly all cases be so badly mutilated in the operation that it is much easier to make a new one than to restore an old.

Again, most of the methods are adapted to roots that are firm and after being cut off to the line of the gums, retain all their normal strength and form. It is often necessary to operate with roots whose buccal, lingual or lateral walls are disintegrated nearly or quite to the alveolar process.

The interior of the root may be coned out deeply, exposing frail and ragged edges, with the gum tissues overlying these edges.

The method I shall attempt to describe is one suited to these latter cases, i. e., roots with frail and ragged edges, with the gum tissues overlying and filling the crown end. The following method will overcome most if not all of the difficulties in the way of success, and allow the setting of a crown that is durable, and useful. To get good access to the root, first pack it with soft gutta-percha pellets, pressing the material out over the edges and building on until the gum is displaced, so that when the gutta-percha is removed a large and free opening is had through the gum, and the edges of the root are fully exposed. This packing should remain two or three days. With a thin platinum ribbon (33 gauge) form a tube, place it over the end of the root and bind with fine wire, twisted until the platinum conforms to the shape of the root.

If the edges are too frail, fill with amalgam in the following manner:

First roughen the inner side of the root or cut ledges if admissible with an engine burr. Select a broach that will enter the apical foramen. Leave this in the canal while inserting the amalgam. Restore the contour if lacking at the same time, and withdraw the broach carefully.

The channel thus formed will be a guide in drilling. Wait a day or two for the amalgam to harden; now the end of the root will present a firm face and shoulder, nearly as good as though the walls had never been destroyed.

With tube over root in place, prepare enough plaster (plaster two parts, sand or asbestos one part), and take an impression of this and adjacent teeth, seeing that the plaster fills the tube down to the root.

When the impression is removed with the band, dry thoroughly. Pour into it Babbitt metal, (Grade C), or Watts or Reese metal.

Break away the plaster and remove the platinum tube, trim away in the metal that portion that corresponds to the gum tissue, leaving a correct model of the end of the root over which to place the permanent band of gold. Fit this tightly to the model, turning a flange over the labial edge, as a rest for the porcelain face. Now prepare the following: Hollow platinum wire (No. 60), a twist drill a trifle smaller than the wire with cutting end cone shaped, so that it leaves the bottom of the drill-hole in that form.

Hard wax composed as follows: Gutta-percha one part, pure beeswax two parts, and sufficient resin to form a mass that will be hard at the temperature of the body. Platinum rolled foil (say No 45 guage, to be used as backing for the crown). Put the gold band in place over the root in the mouth, so that the flange is below the gum line.

Follow the pulp canal with the drill, securing as deep a socket as may be.

Select a suitable plain plate tooth (pins cross-wise preferred), grind to fit, resting the cervical end on the flange of the band.

Lay a piece of the platinum foil on a soft wood surface and press the tooth pins through it. Burnish the foil down to the tooth and over the approximal, cutting the cervical edges so that at the latter point the foil will be between the tooth and the flange. Adjust the tooth so prepared to its place,driving the platinum tube or wire into the drill hole, allowing it to extend to the cutting edge of the tooth. With a hot instrument (flat burnisher), melt hard wax about the tube, inside the band and on the backing of the tooth.

Arrange everything now as you would have it when finished. With plaster and sand, or asbestos, the same as before, take an impression. Should the tooth and band not draw out with it they can be removed and put in place in the impression.

Fill all with a mixture of plaster and sand. Remove the cup and trim down on the lingual side, exposing and removing all the wax. Bend the tooth pins up close to the tube, fill the tube with a piece of broom straw dipped in wet plaster.

Flow solder around these and down over the thin platinum backing until the whole is united to the band at the flange, and a good body of it on the backing. Fit a shell of gold the same grade as the band to the lingual side, resting on the band and fitting the backing closely at the approximal edges and around the tube, which should extend outside of the shell. Solder this in place and finish with files, etc., to a contour corresponding to the tooth being mounted.

Whatever of the tube projects, file off as surplus material.

Place the crown when finished in place, perfect the articulation. Remove and attach with cement (Caulk's Diamond preferred). When mixed to the consistency of cream it gives ample time for the work, and sets hard and firm. Remove the piece of broom corn and plaster from the tube; free access can thus be obtained through this channel, for treatment now or at any future time.

Fill the tube nearly to the end with cement, closing up with a gold filling.

The advantage of this method will be readily seen. It can be used on any tooth, in any part of the mouth.

In bicuspids with two roots, two tubes may be used; and the shell for the lingual side, formed over a piece of dry hickory or other hard wood or swaged over metal dies. In molars a tube may also be used for each root.

Another advantage is in having a hollow pin or wire, nearly the combined length of root and crown, firmly imbeded in cement, giving great strength with lightness. Another, the crown is easy of construction, requiring only those instruments usually found in any well appointed dental office. Still another, it is durable; and the manipulation is postive and adapted to any shape of root.

In one case where this method was employed the root was but ⅜ of an inch in length (a superior second bicuspid) and quite loose, accompanied with ulceration. So frail that any method of band crowning would have been doubtful.

By this method and with good results in treatment after seventeen months of usage, the root is firm, the crown unimpaired, and all doing the service of a good tooth.

A GAS FURNACE FOR METALLURGY.

BY WILLIAM HERBERT ROLLINS, BOSTON, MASS.

This is the second of a series which has been devised for my laboratory. I have already described a gas muffle furnace in a paper read before the Society for the Advancement of Oral Science,[1] and shall hereafter publish accounts of the others. My object is to contribute something toward banishing from the laboratory such antiquated substances as solid fuels. Gas furnaces are superior to those using solid fuel, for they are more rapid in action, and are free from dirt and smoke. With them the required temperature can be maintained at any given point for any number of hours.

FIG. 1.

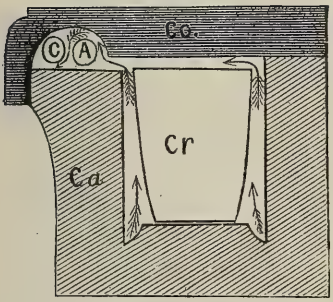
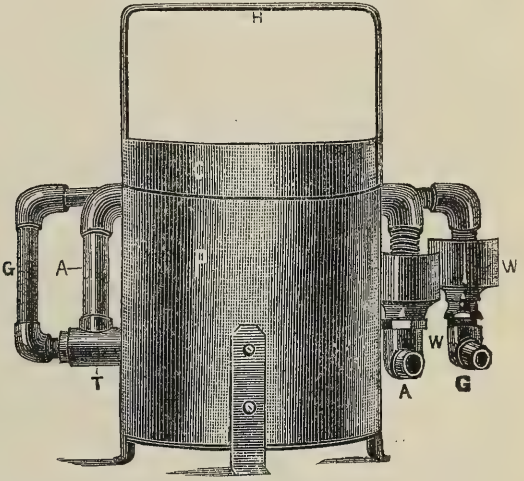


FIG. 2.



All the furnaces of this series presuppose that the laboratory is supplied with an air blast. Even for the small blow-pipe this is required, as it seems absurd to blow a fire with the mixture of carbonic acid gas and nitrogen given off from the lungs.

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[1] Published in Med. and Surg. Journal, of Boston, Oct. 23, 1884.

The furnace shown in figs. 1 and 2 is so simple that any one can construct it for himself. Indeed this is probably the only way in which it can be had, as the makers of dental supplies do not usually care to place any article on the market unless they can be protected by a patent.

Fig. 1 is a section through the furnace. This consists of a pot of porous fireclay Ca with a cover Co of the same material. Between the lip of the cover and the pot is an opening through which the waste gas escapes, surrounding on its way the tubes A and G for air and gas.

Fig. 2 is from a photograph of the furnace. G is the gas tube. A is the air tube. Both are attached by rubber tubes to the gas and air mains. W-W are two cups filled with water, which prevent the tubes G and A, which are white hot under the cover C, from burning the rubber tubes where they are attached at A and G. As before mentioned the tubes, A and G pass under the cover and appear again on the other side, where the tube G enters the tube A, forming a tuyere, the mouth of which fills the opening through the wall of the furnace pot.

In these respects the furnace is simply a small blast furnace.

The gas and air remain apart till they reach the mouth of the tuyere, when they unite and, passing up on all sides of the crucible Cr. Fig. 1, go over its top and escape under the cover, passing all around the gas and air tubes which they heat white hot.

No claim is made that this furnace "will melt steel in five minutes" and any one familiar with metallurgy will see that the principles used are old. Porous fire clay was known in Strabo's time, hot gas and air burned at the mouth of a tuyere placed against an opening in the wall of a furnace have been in use in blast furnaces ever since I can remember, though T. Fletcher has recently invented them in his so-called injector furnaces, another case of adopting other men's ideas without credit.

Any ordinary illuminating gas, works well in the furnace, but the efficiency is greater if the gas is passed through naptha as described in my previous paper.

Countby Doctors can render their shoes water-proof by soaking them in a strong solution of soap for some hours. The compound forms a fatty acid within the leather, rendering it impervious to water.

TRANSLATIONS.

ON THE HISTOGENY AND HISTOLOGY OF THE DENTAL ORGAN.

FROM PROGRÊS DENTAIRE.

[CONCLUDED FROM PAGE 517.]

PART II.

HISTOLOGY OF THE DENTAL ORGAN FROM ITS ORIGIN TO ITS COMPLETION.

Like the nails, the skin, the hair, etc., the structure of the teeth is composed of two very different substances; one represented by the tooth, properly so called, the other germinative, composed of the bulb and the alveolo-dental periosteum in the adult, and in the fœtus by the dental follicle. Of these two forms, the first, intended solely for mechanical necessities, is characterized by its color, its hardness, and by the energetic resistance it offers to physical agents.

This substance possesses neither vessels nor nerves, properly speaking. The other, on the contrary, is abundantly supplied with them; it is soft, and to it must be attributed the phenomena of sensibility which we meet with in the tooth.

In the histologic study of the tooth, we must, then, divide it, as does our subject, into two portions. In the first are comprised the hard parts, the dentine or ivory, the enamel and the cement; in the second, the soft parts, viz., the pulp or dental germ, and the periosteum or alveolo-dental membrane.

HARD PORTIONS OF THE TOOTH.

Of these three parts, the ivory or dentine is the most essential and the most important in the constitution of the tooth; it surrounds the whole dental cavity and consequently contributes to the formation of the crown, of the neck and of the root. The enamel covers that part of the dentine which corresponds to the crown and extends, continually diminishing in thickness, as far as the lower portion of the neck. The cement covers the root of the tooth, and becomes thicker as it approaches the end of the root of the tooth and thinner towards the neck, encroaching slightly on the enamel that covers the crown.

The dentine is therefore exposed at no point, and the tooth may be considered as composed of two layers closely united, one internal and thick, formed of the dentine, the other superficial, formed of the enamel and cement. Each of these substances has its own peculiar structure.

A.—Ivory or Dentine.—The dentine, in a fresh preparation, is a yellowish and semi-transparent substance; in a dry preparation, it is of a pearly gray. It is harder than bone or cement, but softer than enamel. The external surface of the dentine is covered, as we have seen, by the enamel on the crown, and by the cement on the root. Upon the crown it is filled with minute concave and hexagonal depressions, demonstrated first by Owen and Huxley, and destined to receive the extremities of the enamel prisms. On the root, the external surface of the dentine is uneven and rough, with inequalities filled with cement. The internal face of the dentine corresponds to the cavity of the pulp and to the dental canaliculi which derive their origin from it. This cavity, very large in the infant, a period at which the pulp is very voluminous, diminishes gradually with age. This circumstance, according to Magitot, enables us to say that in man the growth of the tooth is continuous, a growth made at the expense of the cavity, whose capacity diminishes gradually, to almost entirely disappear under the incessant production of dentine.

Considered histologically, the dentine is composed of two elements. 1. A fundamental substance; 2. Numerous canalicules which traverse this substance in a direction from the cavity of the tooth towards the enamel and cement. The fundamental substance is always homogeneous, and, even when greatly magnified, it never appears granular or fibrous. Submitted for a while to the action of hydrochloric acid, it breaks up into great fibres parallel to the direction of the canalicules, and these fibres may in their turn be decomposed into smaller fibres, thus simulating a fibrous tissue. But it may be easily seen that these fibres have an irregular form and are purely artificial. They result in fact from the disposition of the tubes which, running parallel to each other, intercept portions of dentine, to which the decalcification gives the aspect of fibres. The fundamental substance is found in various proportions in the different parts of the dentine; thus, in the external portions subjacent to the enamel and the cement, it is more abundant than in the vicinity of the dental cavity; where the canalicules are extraordinarily close. The external surface of the dentine is surrounded by a continuous layer of dark granulations quite numerous and of diverse forms.

This granular layer was taken by Retzius and J. Muller for a mass of bony corpuscles, in which the canalicules of the dentine terminated. But a close examination shows that, although the granulations are continuous with the terminal extremities of the canalicules, we should not mistake them for true bone corpuscles. According to Magitot, already cited, they should rather be regarded as minute lacunæ, hollowed in the thickness of the dentine, at its exterior limit, to facilitate communication between the tubes which furrow this tissue.

This granular layer is called by modern histologists the *anastomotic plexus* of the dentinal canalicules.

These dentinal canalicules were discovered in 1678 by Leuwenhoeck. They are microscopic tubes, hollowed in the body of the dentine,whose diameter varies, according to some, from .002 m. to .005 m., and according to others, from .002 m. to .0015 m. They open into the dental cavity by an orifice which is found in immediate contact with the surface of the pulp, and have a general direction perpendicular to the surfaces of the dentine.

The number of these canalicules is so large that their walls nearly touch. At their origin, at the surface of the pulp, they send off lateral ramifications; finally they undergo a first bifurcation, whose branches are soon subdivided many times, so that a single primitive trunk may, according to Kœllicker, give origin to as many as sixteen canalicules. These canalicules proceed then parallel with one another, but slighting waving, or in form of spirals (which are recognized by a considerable enlargement), without new bifurcations. But when they reach the external surface of the dentine, they divide anew into a multitude of minute branches which terminate in the grand anastomotic plexus, some even entering the enamel. The dentinal canalicules have their walls, easily seen in transverse sections which have been for some time subjected to the action of dilute hydrochloric acid, which at first dissolves the fundamental substance leaving the canalicules intact; these are in turn dissolved a little later, if the immersion in the acid is prolonged. Each canalicule contains a soft and transparent substance, of a viscous consistency, which is continuous with the pulp of the tooth and a dependant upon it. When dried, this substance almost completely disappears and the canalicules are filled with air; they then strongly reflect the light and appear as dark and even black lines. In longitudinal sections of dentine, we find lines curved and parallel to its general direction, more or less numerous, very unequally approaching one another which gives in them a stratified appearance; these have their explanation in the mode of development of this substance, which grows by the progressive addition of concentric layers in the direction of the dental cavity.

B.—Enamel.—The enamel, or vitreous substance, clothes with a smooth and shining layer the external portion of the crown. Its thickness is variable; very considerable at the triturating surface of the tooth, it gradually diminishes, to terminate at the neck in a thin and narrow border. The enamel has a milk-white color, but yet may take different shades, according to the temperament of the subject. It is diaphanous and homogeneous in character, its chemical constitution, very rich in calcareous matter, gives it a hardness which is much more resistant than either the dentine or the cement. The external face of the enamel, which is rugose, is covered by a thin amorphous pellicle discovered by Nasmyth and called by him the *persistent capsule.* This pellicle, named by Kœlliker the *enamel cuticle*, is a very thin membrane which may be separated from the enamel by means of hydrochloric acid; it is transparent and may be regarded as a means of protection for the parts lying beneath.

The enamel is composed of fibres, or prisms, of five or six faces, of a length equal to its thickness, and from .003m. to .005m. in width, planted perpendicularly upon the dentine, to which they are closely united. The enamel prisms join one another by their different faces, without fundamental substance. In the direction of their length we see portions alternately opaque and light, which gives them an appearance not unlike that shown by the striated muscular fibres.

The enamel, once developed, is subject to but a slight organic movement. Such a movement exists, says Magitot, and in fact the changes of density and of color which take place during life cannot be overlooked, nor can the fragility which the tooth acquires when it is once separated from the economy, that is to say, when it is dead.

C.—Cement.—The cement represents the least considerable portion of the dental organ. It is a true osseous substance. In the human tooth it covers the whole external surface of the root, beginning at the neck of the tooth by a thin border, which extends a short distance over the enamel; it gradually becomes thicker as it nears the tip of the root, where its thickness is often as great as three or four millimetres, particularly in old persons, and where there are hypertrophied masses, known as exostoses, which are frequently found in gouty patients. The cement exteriorly looks not unlike bone; it is yellowish and opaque, of a density near that of bony tissue, but inferior to that of ivory. The external face of the cement, covered with minute tuberosities, is invested by the alveolo-dental membrane, which in this case performs the office of true periosteum. Considered as to its texture, the cement presents a close analogy with the bony tissue. Like this, it is composed of a fundamental substance, and of star-shaped cavities (the osteoplastic osseous corpuscles of Robin).

The fundamental substance, deprived of its calcareous salts by means of hydrochloric acid, appears like cartilage, and by heat is converted into gelatine. The osteoplasts are more irregular and unequal than in bone, their axes are parallel to that of the root but their prolongations take for the most part a transverse direction. They are wanting for about a third of the distance from the crown; often appearing only at about the median portion of the root, and always growing more numerous in proportion to their nearness to the tip of the root. The Haversian canals are found in man only when the cement has acquired a certain thickness, at the tip of the root, and in the hypertrophied masses spoken of above. But here we are in the face of a problem, viz., do the osteoplasts of the cement communicate by their divisions with the terminal branches of the dentinal canalicules? This has been asserted by some histologists, and Kœlliker himself describes a special system of intermediary canals, intending to establish these anatomoses. Hannover denies this, declaring that the cement is separated from the dentine by a peculiar substance, *intermediary layer*, transformed from the *intermediary membrane*, which opposes this intercommunication. We will say, then, with Magitot that, without calling in the aid of this membrane, which he has properly rejected, it is not necessary to admit this union between the canals of the dentine and the osteoplasts of the cement, inasmuch as these two substances are too different, as well by their modes of development and of nutrition, which in the two tissues are independent.

SOFT PORTIONS OF THE TEETH.

Under this name we include the dental pulp and the alveolo-dental membrane.

A.—Dental pulp. The dental pulp of the adult s nothing but the papilla or dental germ of the fetus, except that its volume is greatly diminished by the progressive development of the tooth. It occupies the central cavity of the dentine and is prolonged into the root. The papilla takes the form of the walls of the cavity which inclose it; it is therefore spindle-shaped in the canines, while in the molars it presents a number of conical projections, equal in number to the tubercles of the crown. As has been already said, its volume which is considerable in infancy, gradually becomes less with age, and in old age it is reduced to a mere thread, which entirely disappears toward the end of a long life, when the constant production of dentine has entirely obliterated the dental cavity. The dental pulp is a soft substance, of a grayish red color, and seems at its surface to have no adherence to the dentinal wall.

Considered histologically, the dental pulp of the adult presents but slight differences from the same organ in the fetus. It is formed of a tissue slightly fibrous, with a homogeneous, amorphous substance interposed; it is finely granular and transparent, and, in its midst are found embryoplastic nodules. These nodules are smaller than those of the fetus, but their character is identical. According to Magitot there are not found in the interior of the organ in the adult the crystals of hematoidin found by him in the embryo,whilst at the surface of the pulp the cellules of the dentine form a continuous layer. Blood vessels are very numerous in the dental pulp, producing the ruddy appearance so often seen. The pulp receives as many vessels and nerves as there are roots. These vessels enter the organ, and there ramifying terminate at a short distance from its surface. According to Kœlliker, the capillaries measure from .009 mm. to 010mm. in size, and form a very close mesh from which the veins issue. The pulp seems not to be supplied with lymphatics, but is, on the other hand, richly furnished with nerve filaments. Into each root a nerve filament penetrates which measures from .07mm. to .09mm. in diameter, accompanied by several branches, six and even more, which are from .02mm. to .05mm. These branches also penetrate the pulp, there ramify and form a dense plexus which divides into primitive fibrilla, rather pale, which are hardly the .002 to .003mm. in diameter. A portion of these minute fibres end in loops (Wagner), and the rest in conical or button shaped extremities (Magitot).

As the question of the nerve endings in the dental organ are not finally determined for want of proof observations, and also on account of the great difficulties which such an investigation presents, I take the liberty of quoting the opinion of Professor Inzani of Parma who gives the mode of termination of nerves in the tooth as follows: The pale fibers surrounded by membranous tubes pass into the dentinal canals, then enter the enamel, where they terminate in a pencil of filaments swollen and luminous at their ends, where, enveloped by the nerve sheath, they form a club-shaped enlargement .018mm. in length, .006mm. in thickness at the bottom, and .002mm at its smallest portion.

The nerve filament passes into a tube between the papilla and either the dentine or the enamel, where the tube itself terminates on the dark bottom around the enlarged end.

The nerve fibres with double contours divide in the papilla or germ into pale fibres of which each forms a bundle of filaments, which, surrounded by a sheath, emerge from the papilla, dividing into numerous threads, which pass into the membranous tubes of the dentine as far as the enamel. It would seem that for the tooth as for other organs, each thread has attached numerous bundles of filaments or terminal enlargements.

B.—Membrane or Dental Periosteum.—The dental periosteum is a thin membrane in the alveolus interposed between the tooth and the process, and adhering closely to the cement which it covers on every part of its surface. Formed by the external envelope of the follicle, it has its origin at the neck of the tooth, often adhering strongly to the tissue of the gum, of which it seems to be only a continuation. It is this cirumstance which, in extracting, frequently causes the tearing of the gum, unless the precaution has been previously taken to separate the tooth from the soft parts. The periosteum then is directed towards the end of the root, sending out here and there fibrous attachments to the alveolar wall, until, having reached the very tip of the root, it there meets the vessels and nerves of the tooth over which it extends, forming, a sort of sheath, not, as has been thought, folding over into the dental canals and covering the surface of the pulp. These vessels are not then accompanied by the periosteum in their passage through the tooth but, on the contrary, come in direct contact with the dentine.

The structure of the alveolo-dental membrane,belongs at once to that of the mucous membrane of the gum and that of the periosteum of the bone so that we may consider it as intermediary. It is, in fact, formed of a fibrous connective tissue, without any trace of elastic fibres, permeated by a capillary net work, and by numerous nervous ramifications. The vascularity of this membrane, as well as its nervous richness, explain, in a manner that admits of no doubt, the frequent inflammations of which it is the seat, and the acute pains that accompany them. The alveolo-dental membrane may take on a great number of changes, which are still the subjects of investigation by several savants, among whom are some Italian authors of distinction. It seems that this membrane in the aged is subject to a kind of gradual hypertrophy which with other causes, brings about the physiologic loss of the dental organ.

SELECTIONS.

REPORT OF A PECULIAR CASE OF MALFORMATION OF THE JAWS, AND THE TREATMENT.[1]

BY W. W. ALLPORT, M. D., CHICAGO, ILL.

Read to the Section of Dental and Oral Surgery of the American Med. Association, May, 1884.

MR. CHAIRMAN AND GENTLEMEN.—The plaster casts I exhibit to you are models of a case that I have recently had under treatment. It had excited considerable interest and discussion among some of the surgeons and dentists of the patient's native State, but no definite treatment had been decided upon.

On taking up his residence in Chicago, the dentists at his home in New Hampshire advised that he put himself into my hands for such treatment as might be thought best, and the case is, I think, of sufficient interest to warrant me in presenting it to the Section.

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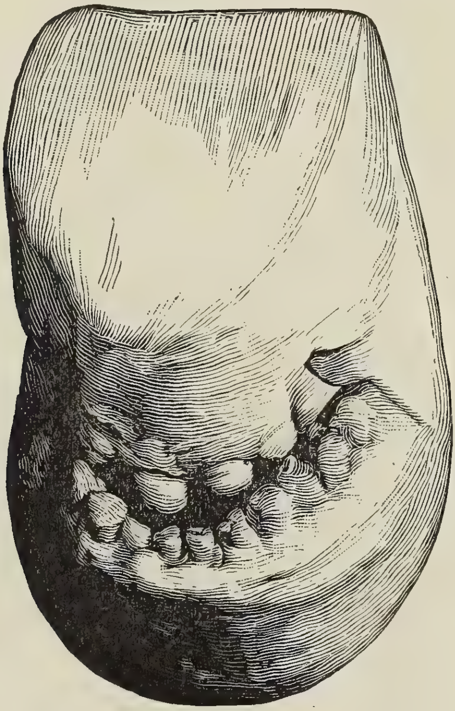
[1] We are indebted to the Journal of the American Medical Association for the loan of the cuts illustrating this article.

Mr. F. L. S——., aged 25 years, consulted me June 22, 1884, for a malformed condition of maxillary arches. The young gentleman is a graduate of Harvard College, and a civil engineer by profession.

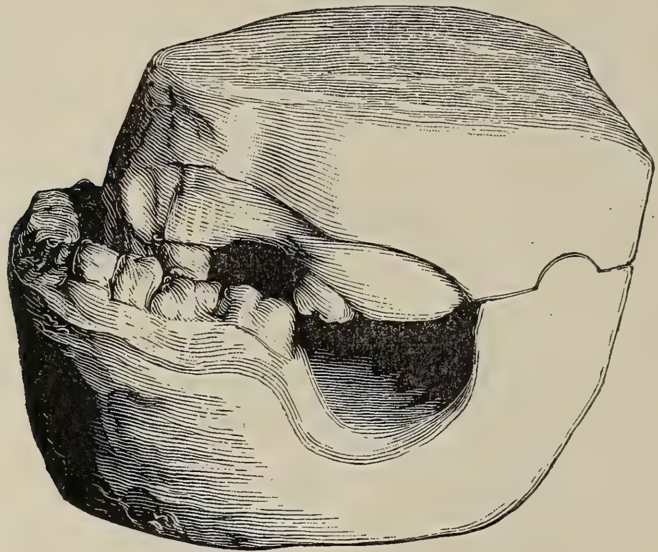
The malformation was such as to make it impossible to properly masticate his food, and his personal appearance, especially when eating, was very unsightly and a source of great mortification.

The trouble was largely due to a lack of development of the upper jaw, consequent upon a failure in the formation and development of the temporary and permanent teeth. Just how many temporary teeth were erupted I am unable to say, but from the best information gained, it is evident he did not have the full complement.

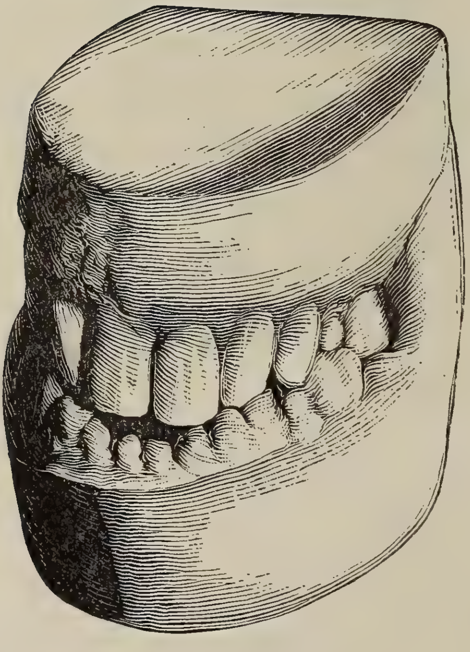


Cut No. i.

When the examination was made there were only seven teeth in the superior jaw, two temporary cuspids, two permanent central incisors, and three molars, the first and second upon the right side and the second upon the left, all being somewhat imperfect in form, and these are the only permanent teeth that have made their appearance in this jaw. In the lower jaw the six anterior temporary teeth were still in position, though much worn away on the cutting edges (see cut No. 2), and the second temporary molars on



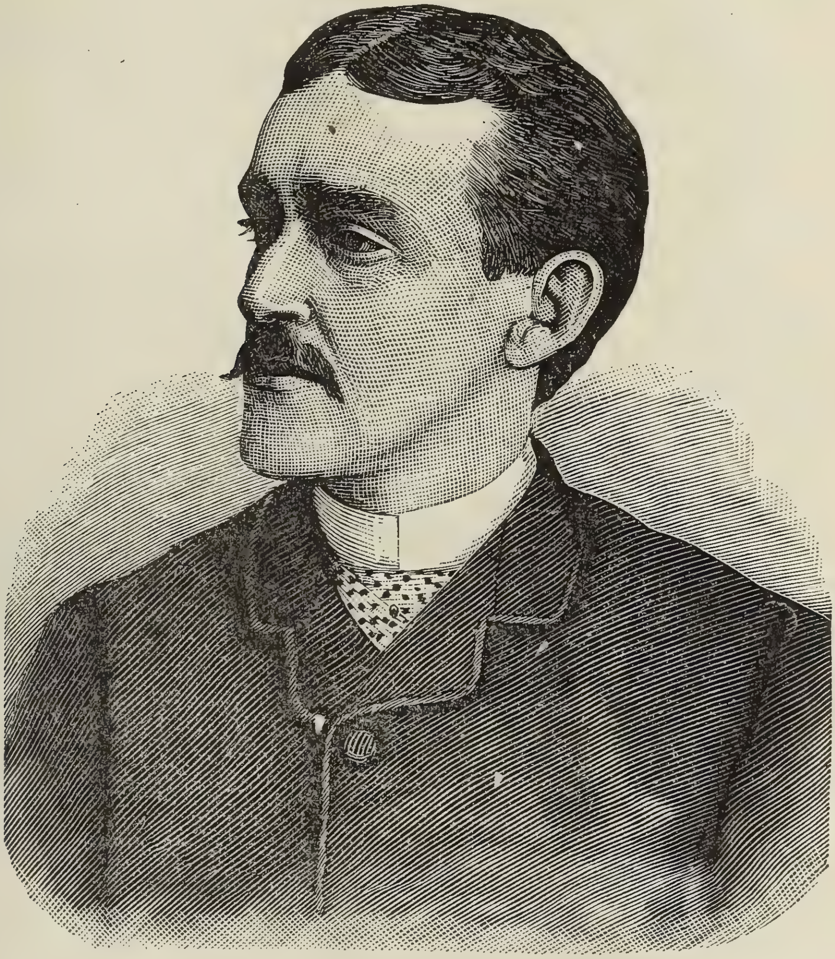
Cut No. ii.



Cut No. iii.

the left side, and both temporary molars on the right side, each considerably decayed. The permanent teeth were the first bicuspid on the left side, and the first molar on either side.

The angle of the lower jaw was less acute than normal, causing the jaw to protrude to a slight extent, but would have caused no marked deformity had the superior jaw been properly developed.



Cut No. iv.

Cut No. 1 represents a front view of the case (taken from plaster casts) with the jaw closed to the full extent.

Cut No. 2 represents a side view of the same models, which shows the extent of the recession of the upper jaw, and the protrusion of the lower; also that the occlusion was such that when the jaws were closed "the bite" was so short as to produce a most unsightly appearance of the face.

To lengthen the bite permanently, gold crowns were fitted over the only superior molar of the left side, and the anterior of the two molars on the right side, and so shaped as to cover in their occlusion about one-third of the grinding surface of the permanent molars in the lower jaw. By this process the bite was lengthened three-fourths of an inch, as evidenced by cuts No. 3 and No. 4, which placed the jaws in a normal position. After the jaws were thus thrown apart, the four front teeth were extracted, a gold plate was fitted to the mouth, and secured by heavy clasps around the gold crowns, and then mounted with artificial teeth secured to the plate by rubber attachments as represented in cut No. 3. Cut No. 4 is taken from a photograph of the gentleman after the operation was completed.

It is a matter of regret that a photograph was not taken with the mouth closed before the jaws were permanently thrown apart by the gold crowns, that the great change in the expression might be seen and contrasted with cut No. 4. But this can readily be imagined.—*Journal of the American Medical Association.*

DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION.

TWENTY-FOURTH ANNUAL MEETING AT SARATOGA.

Reported for the ARCHIVES OF DENTISTRY by Prof. Chas. Mayr.

(Continued from page 525.)

WEDNESDAY EVENING SESSION.

By special vote of the society the evening session was occupied by Dr. J. L. Williams, of New Haven, Conn., who read a paper upon "The Origin of Enamel and the nature of Odontoblastic Cells." It was illustrated by a great number of very beautiful preparations, the images of which were projected upon a screen by means of the stereopticon. Owing to the necessary darkening of the hall, as well as to the absorbing beauty of the preparations which continually distracted the reporter's attention, the notes of the paper are not as full and perfect as they might otherwise have been.

The speaker commenced by criticising the expressed views of Dr. Garretson, Dr. Cryer and others, and stated that he would demonstrate they were based upon faulty preparations and imperfect knowledge.

He had presented this matter at the last meeting of the New England Dental Society, and it was then privately remarked that it was of little importance whether or not his own theory was the correct one. He differed with them, for it was impossible for one to undertake, with any hope of success, such a work as the joining together of parts of broken teeth without a definite knowledge of the nature of the process. Besides, as professional men, it is our bounden duty to obtain all the knowledge possible of the tissues upon which we operate.

It is of the greatest importance that the student should be correctly taught concerning this subject. The purpose of this paper was to point out the most important fallacies still existing concerning the structure of the teeth. For that purpose he would consider what is stated about the papilla of the pulp, and show that there is an enamel organ which has a definite structure, and that the formation of this enamel organ takes place from the dentine outward. He would show that the odontoblasts are ganglionic elements, sending branches into the dentine and the pulp. To answer the question, why this was not established before, he would say that it is very difficult to obtain specimens that show the natural relations of the dental tissues to each other and the surrounding tissues, without breaking the continuity of the structures. A great number of microscopic slides were shown, most of them photographic; a few, diagramatic.

First slide. From a professional dealer in microscopical specimens. In this you may see the appearance of what Dr. Garretson calls the utricula reflexa. All the delicate structure, the basement membrane, and the enamel organ are destroyed; this slide has some historic value, just as the implements of the stone age tells us of the progress that has been made.

Second slide. This is in contrast with the foregoing. The old views were derived from balsam-mounted specimens, which define less distinctly than those mounted in glycerine. This slide shows the first differentiation that marks the beginning of the tissues; it is perfect in every way, except at one point. The groove of which Dr. Garretson speaks is filled out with the enamel organ, which is destroyed very easily by careless preparation. The former logic in support of the theory about the formation of the enamel ran thus: The enamel is an epidermoid structure; all epidermoid structures are formed in the same manner —ergo, the enamel must be formed in same manner. This is only a trick of logic, not supported by any evidence. A vast amount of ignorance may conceal itself behind a general physical law. A little definite knowledge is better than generalizations, which may mean something sometimes, but generally do not. How a tissue which never grows after it has been destroyed, can be compared to one which is constantly thrown off and replaced by a new one, is beyond comprehension.

Third slide. Tinted a very little with carmine, beautifully shows the origin of the dental tubuli and their ends.

Fourth slide. Shows a permanent tooth, with the pulp removed and the dentine cells in some places intentionally forced away from the enamel.

Fourth slide. Shows a cut through a temporary tooth a little to one side of the center, cutting through the completely formed enamel with its hexagonally divided arrangement.

Sixth slide. Shows something like crochet work. It is possible that the enamel may be formed by intercellular deposits; of such formations we have analogies; the Placoid scales are formed in the same manner; they have spinous projections that have an enamel layer which is deposited as a cuticular deposit of the epidermis. This crochet-like looking tissue is from the embryonic shark; it looks like an embryonic tooth.

Seventh slide. Shows the cord which is drawn down at the first folding of the dental cyst,and which develops from the columnar layer of epithelium. It is already broken from its union with the upper layer, and the tooth cyst is isolated thereby; this specimen shows also the development of a beautiful reticulum of the enamel organ; I have not determined whether it is developed by direct reformation of cells or by a breaking down of embryonic tissue. After the completion of the enamel, the organ is exhausted, yet it remains on the lower side of the tooth until its work is also done there, after which it disappears.

Ninth slide. Shows an additional proof of the existence of the enamel organ; the enamel-forming cells and the reticulum are there, but the stellate cells, seen in the former specimen, are not seen. On the top of the tooth the enamel organ has disappeared, and the calcification is complete. At the sides it is not complete,and therefore it still exists there. The pericementum makes its appearance, and thus a connection of the tooth with the external world is established.

Tenth slide. You remember that on a previous slide, No. 8, at the lower end of the enamel cap, there was shown a columnar layer of cells which came, in the development of the cord, from the columnar layer of epithelium above. This is a highly magnified view of this point at a later stage. The columnar layer has disappeared, and the space is occupied by indefinite embryonal tissue or indifferent corpuscles. The reticulum of the enamel pulp, shown here, is very beautiful. The embryonal corpuscles forming the lower part of the indifferent tissue are developed from the ameloblasts or enamel-forming cells.

Eleventh slide. Shows a somewhat advanced tooth germ; the ameloblasts are above the flattened layer; above it, is also visible the reticulum of the enamel organ.

Twelfth slide. Shows the amelobasts in the form of biscuits; the analysis proves that this portion is highly impregnated with lime salts. I, said he, call your attention to the odontoblasts. You know that Dr. Heitzman and others have represented them as round corpuscles, between which the dental fibrillæ pass. I have satisfied myself that this has been an erroneous view, but it was not until within a short time that I have succeeded in cutting a section so thin, that only one layer of odontoblasts was obtained. I can show you photographs in which the dental pulp and the enamel pulp are in perfect contact, and others, where the first faint traces of dentine and enamel appear. (The photograph was here exhibited.)

This specimen I exhibited to Drs. Heitzman, Bodecker, and Atkinson; Prof. Heitzman only glanced at it when he turned to Dr. Bodecker with frankness and said: "It is evident we have made a mistake;" subsequently, he thought he could detect delicate fibres passing between the fibrils.

Thirteenth slide. You see the prolongation of the odontoblasts into the tubuli; one point shows two fibrillæ originating from the odontoblasts. I discovered that sometimes three or more fibrillæ are projecting.

Fourteenth slide. I have often been asked how I explained the formation of dentine. Do these cells perform a double function? are they the elements of sensation and of the formation of dentine? We often see a multiplicity of functions performed by embryonal cells. The odontoblasts are essentially neural matter and are probably also the secretive elements of the dentine. Some species of molluscs show similar cells in the digestive tract, and they are exhibited in the photographic slide, thus proving their multiplicity of function. I trust that this addition will prove of benefit to all. I have sometimes spoken a little sharply, because I would not like to see the results of the study of years set aside by a hasty examination of inferior specimens and sections.

At the close of the very instructive and interesting address of Dr. Williams, Dr. J. H. McKellops asked the suspension of the order of business that an announcement might be made. Leave being granted, he called upon Dr. W. C. Barrett, who aroused the sympathy of every member by relating, in a touching manner, the particulars of a very painful accident that had just occurred. The little motherless boy of Dr. W. R. Clifton, of Texas, was, in company with his aunt, crossing the street, when a carriage, driven at a reckless speed, ran over him, crushing the skull and breaking a number of bones. The sympathy of the Association was tendered Dr. Clifton, and the executive committee was, by vote, directed to engage physicians and nurses, and to take measures to bring the criminally reckless driver to justice.

Dr. Atkinson.—Desired to express his obligation to the writer of the paper, and had commenced a consideration of some of its points when he was interrupted by Dr. C. W. Spalding, who said that he had been so shocked by the relation of the terrible accident that he was in no mood for a discussion, and he thought others were in the same state. He therefore asked the speaker in possession of the floor to give way for a motion of adjournment.

Dr. Atkinson.—Said that he was astonished at the puerility of the excuse for adjournment. We were never more clearly in the way of right than when we were pursuing the path of duty and earnestly laboring at the business directly before us. He declined to give way and continued his remarks, but the sentiment of the meeting was evidently against him, and the members left in such numbers that an adjournment for want of a quorum was soon a necessity. The painful accident seriously interfered with the consideration of the paper.

WEDNESDAY MORNING SESSION.

Prof. Chas. Mayr.—Almost all differences in the different views about caries seems to come from an indefiniteness of what and where the caries really is. If a patient comes to you with an aching tooth, is the ache the caries? Certainly not. Or the tooth?—again not. Or the plug you dig out? Not at all! But while you begin to dig the patient first feels nothing, then he becomes nervous and complaining, as you reach a certain poiut, which irritability again disappears, when you come into healthy dentine. The "caries" comprises therefore only that small diseased layer, probably not over $\frac{1}{100}$ of an inch thick,which was sensitive; outside we have the worthless plug or corpse of the tooth substance; inside, the healthy tooth. Dr. Miller seems to have mostly examined the corpse, and produced the corpse,but not enough of that extremely small border line. In an abscess,the pus is not the seatof the disease, nor the inflamed tissue underneath, but that small layer of tissue where the physiological—or, if some fogies like the word better, pathological—processes are going on, and the study of this layer will enlighten us about the abscess, but neither the pus or the inflamed tissue underneath will tell us much.

Dr. Atkinson.[1]—What is a process? It is a going on of something. What is a thing; a thing is a think. Pathology is only perverted physiology. The function of building a tooth is its evolution, the decay, decadence, its downfall. Thanks to Carl Heitzman and to the angel that squeezed him from Rokitansky's laboratory and sent him over to us, the most ignorant may work now as intelligently as such angel. The typal order of the enamel is a modification of that of the dentine. The enamel is really a living tissue as shown by the presence of protoplastic strings between the enamel rods. The bacteria are not found in the basis substance but in the tubuli of the dentine, going towards the pulp. There are bodies that we have not seen with the highest power of amplication and concentration of light, we may call them ghosts, the ghost of the bacterium is there, before the bacterium can begin, but when we can color them we only deal with the tracks of ghosts; but the tracks would not feed of us we want to have a ghost for dinner.

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[1] We wish everybody would read tbe full speeches of Dr. Atkinson in the final report. Their fine logical web cannot be extracted, we only give a few aphorisms.

Miller was honest. Do you know, that it is the greatest insult to a man, to have it said of him, he is honest. I would rather like to take five hundred boys of ten years of age that have good English education to understand my English and agree to make them good anatomists, physicists, pathologists, therapeuticists and operators in five years, than take five graduates? Why? Because the latter have said: Error, be thou my truth. Darkness, be thou my light! That is what they have done from the Pope down.

Dr. Spalding.—I have long held that there was no pathology except that which proceeds from physiology; that there is no pathology, *per se*, neither in function nor in growth. The processes are all inverted or perverted physiological processes, and the growths are physiological growths out of place.

Our text books are full of descriptions of pathological anatomy, pathological growths and pathologicul processes. When, as Dr. Atkinson has just said, there are really no such things; but they are simply inversions of true physiological forces which arecalled pathological.

I only intended to enforce the idea advanced by Dr. Atkinson.

Dr. Barrett.—We spent considerable time this forenoon soaring in the infinite. Let us come down to a cash basis. We come here not to study or consider ghosts but material things. We all like to hear Dr. Atkinson, but the question up now is not to study the tracks, but the game. Let us go down to the actual demonstration and actual experiments. We cannot speak of the power of a bacterium, as that of a raging animal,boring into the teeth for the purpose of devouring living tissue, that is not the character of the fungi of caries, they are of a vegetable nature. Putrefactive and fermentative conditions, are almost the converse, putrefaction does not exist as the same time with fermentation. Forevery one experiment Prof. Mayr has made Dr. Miller has made fifty. According to my own stand-point, the rationale of decay is about like this. First there will be the decalcification of the exterior portion of the enamel; after the decalcification of the enamel the dentine is reached and on one—may be single—point, the lime salts are removed, the substance becomes a spongy mass, which takes up within its pores sacharine fluids from the mouth, which are favorable to the development of fermentive fungi; these fungi eat the spongy mass. In the course of their existence, they produce an acid which Dr.Miller proved to be lactic acid,which continues the work of decalcification and so ad infinitum.

Dr. Abbott.—Dr. Barrett said we ought to deal with actualities and not with ghosts. What we have been able to discern with the naked eye or the strongest power of the microscope. Does this put us into a position to say that there is nothing beyond? It was only a few years ago that microscopes which magnified 500 diameters were something wonderful—remarkable; but there must be something smaller and smaller, as Dr. Atkinson said, a ghost. Dr. Miller seems to neglect the fact that the tooth has 25 to 30 per cent. of organic material and is a live organ and considers too much the organic salts.

EVENING SESSION.

The Speaker demonstrated how former exploration of the growth of the enamel pulp and the dental grooves were due to falty preparations; the paper was elaborate and without the illustration of little instructive value. We can only advise our readers to get the full report of it; it is exceedingly valuable and well worth reading, and we do not remember to have listened to as lucid a demonstration of the intricate and dry microscopic details of the development of the enamel as that paper of Dr. Williams gives.

Dr. Atkinson.—I can hardly restrain my joy at the progress, made in dealing plainly and simply with the most profound research and interpretation of the manner in which the elements of the teeth are brought within the scope of our perception. Let us dilate a little upon the mannar in which we have been blessed by this very rare treat, the chairman of the committee of arrangements had the good fortune to secure.

The accident which happened to the child of Dr. Clifford of Waco, Texas, is reported, and the association passes a vote of sympathy, the president of the town is introduced and promises to act vigorously in the matter.

Dr. Atkinson.—Proceeding after this interesting story Dr. Spalding think it might be untender, but Dr. Atkinson replies of the best way to show sympathy is to go right ahead in our duty. Dr. Atkinson also adds some more historical explrnation as to the difference between the conceptions of the school in Philadelphia and Dr. Williams. Adjourned.

[TO BE CONTINUED.]

FLORIDA STATE DENTAL ASSOCIATION.

Pursuant to a call, a large number of the Dentists of Florida, met in Library Hall, Jacksonville, Fla., Oct. 15, 1884, and organized the "Florida State Dental Association," by the adoption of constitution, by-laws and code of ethics and the election of the following officers:

President, Dr. James Chace, Cedar Keys; First Vice-President, Dr. W. W. Towsend, Orlando; Second Vice-President, Dr. W. McL. Dancy, Jacksonville; Recording and Corresponding Secretary, Dr. Duff Post, Tampa; Treasurer, Dr. H. M. Graniss, Orlando.

A committee was appointed to draft a bill to be submitted to the State Legislature and the Secretary was instructed to mail to every dentist in the state a copy of a resolution, passed by the Association, requesting them to use their influence with their representatives in the Legislature to vote for the bill to become a law.

Dr. W. McL. Dancy, was unanimously elected a delegate to back the Southern and American Dental Associations.

Tampa was selected as the next place of meeting.

The Association then adjourned to meet in Tampa the first week in May, 1885.

Duff Post,
Recording and Corresponding Sec'y.
Tampa, Fla.

CHICAGO DENTAL SOCIETY.

Reported by P. J. Kester, D. D. S., No. 628 West Lake Street.

The regular meeting of the Chicago Dental Society was held in the Chicago College of Dental Surgery rooms, Tuesday evening October 7, Dr. Harlan in the chair. The subject for the evening was Pregnancy and its effects on the teeth of the mother and child. The discussion was opened by Dr. Geo. H. Cushing. He said the inference was that there were adverse conditions during pregnancy. We are not prepared to admit that pregnancy is a disease, but the present state of society seems to make it so. which is true to such an extent that nearly every woman during this period considers herself a fit subject for the physician's care.

The effect upon the teeth of the mother or child, whether it be good or evil must be brought about through nutrition. During a healthy pregnancy the nutritive process is carried on at its height.

According to a German author it was found that in the mouths of anæmic patients the saliva swarms with leptothrix, and in many cases where death ensued, a post-mortem developed the fact that the liver also contained them in great numbers.

The teeth of the mother are affected during pregnancy by the general disturbance of the system and more especially the nutritive process; nausea, morbid appetite, etc, are some of the symptoms usually present, and that the child should suffer seems perfectly natural.

The treatment during this period can be summed up in the one word hygiene, a subject which we as dentists do not give the attention, that it merits.

Dr. Brophy.— Believes that morbid appetites during pregnancy are an index to the needs of the system and should be satisfied, and such food as will build up all of the tissues of the body should be provided.

Dr. Newkirk.—Hereditary influences are to be considered; whatever would affect the general health would affect the teeth.

That the teeth suffer during pregnancy is probably due to a lack of proper assimilation of the elements necessary to the nourishment of the system. As to treatment he would recommend out door exercise, pure air and simple wholesome food.

Dr. Wassall—There is one cause of the decay of the mother's teeth that has not been mentioned. Lack of care and attention, which may be called a local cause. That the fluids of the mouth are depraved during pregnancy, from disturbance of the general system, is a reason why the teeth should receive especial attention at this time.

Dr. Swain.—The effects of the general disturbance on the secretions of the mouth and lack of care would account for the great number of germs and micro-organisms found in the mouth.

Dr. Harlan.—If in the early stages of pregnancy the teeth are put in good condition, and properly taken care of, the fluids of the mouth are not liable to become vitiated. I have noticed that the teeth of patients with very dark or very light hair are less liable to decay then those of the medium shade. When white spots appear on the teeth during pregnancy, they can be removed and polished if seen soon after delivery, thus obviating the necessity for filling.

Syrup Lacto-Phos. of Lime may be given in doses of ½ to ⅓ tea spoonful to relieve the nausea of pregnancy.

MASSACHUSETTS DENTAL SOCIETY.

The tweniieth annual meeting of the Massachusetts Dental Society will be held in the rooms of the Boston Medical Library Association No. 19 Boylston Place, Thursday and Friday, December 11 and 12, 1884, commencing at 11 o'clock Thursday.

W. E. PAGE D. M. D., Secretary.
11 Studio Building, 110 Tremont St.

Boston, Nov. 25, 1884.

JOURNALISTIC.

"Reading maketh a full man; conference, a ready man; and writing, an exact man."

EXPERIMENTS ON MODELING COMPOSITION. By Stewart J. Spencer, D. D. S., San Francisco, appears as the second article in the October *Ohio State Journal.* He used two kinds of the material hard and soft, but does not tell us the composition of either. He thinks that where strong compression is required to equalize the pressure of a full plate on an irregularly hard and soft mouth, this composition used hard and with strong pressure is unparalleled as an impression material. With regard to its ulterior uses, he has found it well adapted for duplicating models, but his experience with it for base plates and articulating impressions has been decidedly unfavorable. In summing up he says, that it requires more skill and acquaintance with it, to take a correct impression, than with either plaster or wax, but if understood is very useful and nice to use. The harder material proved itself in these experiments to be the better in almost every instance.

CHEMISTRY (?) Dr. Watt in an editorial with this title endeavors to correct a false impression regarding arsenic. "That arsenic, in some way, continues to advance into dead tissue, we have demonstrated by taking a pieceof muscle from an ox. A piece half an inch long was laid on a fragment of clean glass. A very minute quantity of arsenic was applied to one end of the flesh, leaving no surplus or residue. It was kept in the dark, in a cool room, and, from time to time, slices were cut off from the distal end and tested. Several trials were made before arsenic was found, but it due time it permeated the entire piece of muscle. * * * Of the fact that arsenic is absorbed, or, at least that it permeates tissues to considerable distances beyond the points of its application, the proof is abundant and easily found."

THERAPEUTIC PROPERTIES OF TIN is also discussed by Dr. Watt. He says, that tin has no therapeutic influence, but it may be acted upon by chlorine and the chloride of tin is highly antiseptic. He says. "We can understand that tin, in contact with gold, and immersed in the buccal fluids is more likely to be chemically acted on and the action is likely to be more energetic than if the gold were not present."

FOR SENSIVIVE DENTINE.—*Items of Interest.*—"Dr. T. A. Robinson, it will be seen in our report of the American Dental Association, recommends equal parts, by weight, of carbolic acid and caustic potash ground together.

He applies in small portions to the cavity, and in a few minutes wipes it away, repeating it if necessary. He also finds it good as an application to aching exposed pulps preparatory to treatment. It sometimes gives a little pain—but not severe. He modified it, occasionally, by adding oil of cloves, or creasote, as in his judgment the case might require. He had used it for about twelve years with increasing satisfaction. He thinks it seldom needful to destroy exposed pulps."

"THE MINNESOTA DENTAL ASSOCIATION has had its first session. This State almost completes the circle of States; a few more left. Its officers for the ensuing year are taken from its best operators."

The *Items* must be mistaken in the above. In 1873 and 1874 we had the pleasure of attending the meetings of the Minnesota State Dental Association, and in the July number of the MISSOURI DENTAL JOURNAL, for 1875, we find the following:

DEAR SIR:—I enclose a synopsis of the proceedings of the

Fourth Annual Meeting of the Minnesota State Dental Association, with the request under instructions from the Society, that the same be published in your journal. Yours truly,

WALTER F. LEWIS,
Secretary M. S. D. A.

The Society has been sleeping for some years, and perhaps it has forgotten all about the past.

LEADING FLORIDA dentists were to meet at Jacksonville, October 15, to form a State Association.

DEODORIZED IODOFORM. *The Canadian Practitioner* contains the following formula:

Iodoform, - - - - -	18 grammes.
Sulphate of quinine, - - -	3 "
Powdered charcoal, - - -	15 "
Essence of peppermint, - - -	40 drops.

Thus prepared the iodoform may be associated with the ordinary liquid excipients.

THE MAINTENANCE OF HEALTH AMONGST THE PRACTITIONERS OF DENTAL SURGERY. Discussion upon Mr. Oakley Cole's paper read before the Odontological Society of Great Britain, published in *The British Journal of Dental Science.* Dr. George Field said he had had some experience of bad health, and he should be very glad to find a means of escaping it in the future. He thought the fact that dentists as a rule worked in a room with a northern aspect, was one element affecting their health; they did not get enough sunshine.

For the last four years he had worked under a southwest aspect, and he believed he had been better for it; the light was somewhat changeable, but he did not find this a serious objection. He was accustomed to work with a open window whenever the weather would permit.

There was the question of exercise, and as to this he would suggest to those who had not tried it a remedy which he had found eminently beneficial in his own case,viz.,the use of a tricycle. He had been accustomed to sit at his work for some years past. He used what was called a "shooter's walking-stick," which was very light, easily adjustable, and permitted great freedom of movement to the body. Itwas the best contrivance of the kind with which he was acquainted. H.

MISCELLANY.

TREPHINING OVER THE FRONTAL SINUSES

BY T. O. SUMMERS, M. D., JACKSONVILLE, FLA., FORMERLY OF NASHVILLE, TENN.

In the September number of the *Practitioner* I presented to your readers an interesting case of mastoid diseases relieved by the trephine. I have to offer you this month the report of a case, most remarkable in its history, and most satisfactory in its ultimate issue.

Several years ago, Mrs. P—., while holding a child in her lap was accidentally struck by the little fellow just over the upper and inner angle of the orbit, producing a contusion remarkably greater than might have been expected from such a blow. Her health at the time was bad, and before the ecchymosis had subsided, she was confined to her bed with typhoid pneumonia. In this low condition of her system, reparation of even the slightest injury was out of the question. Ulceration of the bruised spot set in and was rapidly destructive, denuding the bone and attacking in turn the thin shell which forms the outer wall of the frontal sinuses. The cavity was soon entered and from the posterior plate sprang up an osteo-fungoid pillar, like the stem of a young cauliflower, about 6 millimeters, or say a quarter of an inch in diameter. This was capped with a granulated efflorescence and altogether resembled a young mushroom before the umbrella is opened. The skin of the forehead fitted closely about the stem of this growth, which protruded about 5 millimeters above the plane of the integument. From this place a sanious pus continually exuded, and constant facial neuralgia rendered existence almost unbearable.

I examined the case August 6, and resolved to trephine the next day. Assisted by my associate, Dr. J. M. Coyle, I dissected the integument from about the pillar of osteo-fungoid, as I have termed it, and lifted it over the cap, the hole in the skin being bevelled at the expense of its external surface, and the edge resembling the selvege of cloth.

After planting the trephine, including in its crown the bony excresence, we bored down to the internal plate and finished with the dental engine by burrowing beneath the line of the trephine crown, bevelling down to the dura mater and then lifted out the button with the excresence attached. The internal plate was ulcerated and soft, but the dura mater beneath was intact. The patient has completely recovered without a single unfavorable symptom or the slightest vestige of facial neuralgia.

What was this excresence?

I have decided that it was an imperfect development of bone, not reaching the plane of physiological structure—a perverted nutrition the result of zymotic sanguification.

Southern Practitioner.

MONTHLY LIST OF PATENTS.

The monthly list of patents for inventions relating to Dentistry, bearing date October 21, 1884, reported expressly for this paper by Louis Bagger & Co., Mechanical Experts and Solicitors of Patents, Washington, D. C.

306,298. Dentists' file holder, J. Z. Walling, New York, N. Y.

305,900. Dental impression cup, R. F. Crowther, Baltimore, Md.

306,421. Disinfecting apparatus, S. W. Parker, and H. Blackman, New York, N. Y.

The Later Anesthetic.— About two hundred people of scientific inclination gathered at Market Hall, St. Paul, Minn., a few weeks ago, to listen to Dr. Howland's illustrated lecture on anesthesia. The stage was plentifully supplied with scientific apparatus, and the audience, though small as to numbers, found the lecture entertaining and instructive. Dr. Howland stated that from his own experiments and the practical operations in Paris, he believed that the administration of nitrous-oxide and air, or nitrous-oxide and oxygen, in condensed air chambers, will yet supersede the use of ether and chloroform in prolonged dental and surgical operations. The reason why nitrous-oxide cannot be used for prolonged operations, as ordinarily administered, is that the blood does not obtain any oxygen from it, the nitrous-oxide being exhaled from the lungs undecomposed; and if breathed without air, oxygen will produce asphyxia. He had administered nitrous-oxide for dental and surgical operations to more than 30,000 persons, and had found that when pure nitrous-oxide is administered without any admixture of air, the average time of producing anæsthesia is fifty seconds, and the average time from the first commencement of the breathing of the gas until the return of consciousness is two minutes. He claimed that anæsthesia can be produced for prolonged operations, by means of nitrous-oxide, eighty-five parts, and oxygen, fifteen parts, without danger of unpleasant sensations. The lecturer next proceeded to demonstrate his theory, using a chicken for that purpose. The chicken was put in a small air chamber and condensed nitrous-oxide forced from a rubber bag into it, and after a brief space oxygen was added. The chicken was found to be thoroughly anæstheized. The audience filed upon the stage and inspected the "subject," after which it was restored to consciousness, and was apparently as well as ever. The lecturer instanced several important surgical operations which had been performed through this new agency in Europe and in America, and concluded, after some further interesting scientific demonstrations, by claiming that the time would soon come when chloroform and ether would be superseded by this new and harmless anæsthetic.

AMALGAM NOTE.—Dr. Bogue at a recent meeting the New York Odontological Society, said:

"I must confess my disappointment when I hear gentlemen of The Odontological Society speak of squeezing their amalgam, and I am not surprised that any gentleman who manipulates his amalgam this way should find it utterly unreliable.

"It is not much more than a month since one of my professional brethren said to me, 'What do you mean by weighing the component parts of your amalgam;I could not spend the time, how do you do it?' Now I supposed that every member of this Society knew a Fletcher Balance as well as I know a water jug. This gentleman did not. I showed him how to use it and he acknowledged it was a good thing.

"I frequently see the names of gentlemen belonging to the Odontological Society are given to the makers of amalgams, certifying this: 'Your amalgam is the best I have ever used,' etc. Either this means something or it means nothing. If he has carefully tested by mechanical and chemical tests, and by specific gravity, and knows whereof he affirms, that testimony ought to be valuable, but if he merely guesses and tells of some fillings he guesses have been in six months or guesses they have been in six years, and says they look well; if he rubs the amalgam in his hand and says, 'Yes, I will give you a certificate,' it does not show that in this 'district school' we are learning a great deal."

EDITORIAL.

The subject of pulpless teeth has been under discussion in late numbers of the *Medical Record*, and the opinion has been expressed by a contributor, and endorsed by the editor, that all such teeth should be promptly removed from the jaws.

The subject was introduced by Samuel Sexton M. D., who expressed the belief that since dead and diseased teeth have been so carefully retained by dentists, nervous diseases about the head have become alarmingly common; and he closed his communication by saying that "he sometimes thought the evil done by ill-advised dentistry was greater than the possible good arising from the work of the more capable dentists."

Dr. Sexton's observations upon the patients of a public infirmary are no doubt mainly limited to persons who employ inferior dentists whose operations are no more comparable with those of the "more capable dentists" than are the practices of quack doctors with those of the more capable physicians.

But how happens it that so mnch of this "ill-advised dentistry" is donc? The reason is obvious. Until within a very few years any one who chose, could engage in the practice of dentistry, and no matter how incompetent he may be, persevering advertising would bring him subjects, and as neither the public nor the physicians were, or are capable of judging the quality of a dental operation, a good deal of work would be done, and much money collected before the incompetence of such advertising dentist would be ascertained. The money received would pay for more advertising and thus bring more victims, and so the work would go on *ad-indefinitum*, as well as *ad-nauseum.* It is our deliberately expressed conviction that there is in the community no other equally intelligent class who are responsible for this state of things to the same extent as are medical men. If they do not encourage "ill-advised dentistry" they do not discourage it. They are often looked to for advice on this subject by their clientage, who we regret to say, are sometimes illy advised.

Dentists have struggled hard and long to rid their profession of this incubus which brings them into disrepute, and their efforts in this direction have met with little support from the medical profession. There are notable and noble exceptions to this statement we know, and they are duly respected and honored.

The editor of the *Medical Record* speaks of the "peril of tooth-saving" as if there was danger in the attempt. This every intelligent dentist knows is a misapprehension. As well might *we* complain of the perils of finger-saving in a case of felon, or of eye-saving in a case of iritis or of cataract, or of limb-saving in a case of abscess.

Pulpless teeth are not necessarily dead. The terms "pulpless teeth" and "dead teeth" are by no means synonymous.

Is not an inflamed tooth-pulp or periosteum amenable to treatment on the same principles as are inflammations in other organs and tissues? Let the editor of the *Medical Record* answer! If evidence were needed to demonstrate the necessity for the better education of physicians in diseases of the teeth, the articles under discussion would afford that evidence. The fact that physicians are so illy informed upon this subject is not so much their fault as it is their misfortune. Medical text books contain little or nothing upon dental diseases, and no more is taught, at least until very recently, in medical schools. Consequently, they could not be expected to be well-informed upon this subject, and should not be held responsible for the errors of diagnosis and prognosis which they so often commit when attempting to pass upon either the nature or the causes of diseases of the teeth, or of reflex or sympathetic affections arising therefrom. The remedy for the whole difficulty is very simple. It consists in the better education of dentists in certain branches of medicine, and the better education of physicians in certain branches of dentistry.

The former is now well provided for by the dental colleges, and the importance of the latter has already been recognized and acted upon by a portion of the medical schools.

The present duty of physicians is to exercise more care in the selection of the dentists whom they recommend, and to avoid casting upon the dental profession the sins of uneducated and incompetent men who call themselves dentists, but are not recognized by any of the organized bodies of that profession.

The chief difficulty of the position at this time, and the main cause of complaint against physicians is, that as a rule, they do not properly discriminate between the educated and the uneducated practitioners of our art. SIGMA.

The article on the Histogeny and Histology of the teeth, translated from the French for this journal, and published in this and the preceeding numbers, will furnish to such of our readers, as are familiar with the subjects treated of, a convenient compendium of the views that prevail on the continent of Europe at this time upon this important branch of dental science, and at the same time afford an opportunity for comparison with those held in this country. To those who have not studied the subject attentively, the translation will present the matter in a brief yet comprehensive way, which will impart ideas upon the subject in a manner clear enough to enlist their interest and lead them to the future study of subject for themselves. Its careful perusal, will, we feel sure, interest both classes, and to the latter serve as a synopsis, which will stimulate to a study of the subject more in detail.

It is not often the case, when one gets married, that the event is spoken of as a "death," or that one of the parties to the transaction is referred to as "deceased," etc. Some of our cotemporaries, in referring editorially to the recent *consolidation* of the ARCHIVES and the *New England Journal of Dentistry*, either misunderstand a plain statement or wish to mislead the profession. To record, without modification, of the *New England Journal of Dentistry* that it is "no more" is a mistake. To state, in an unqualified manner that it has "succumbed" is—if the word is used intentionally and with an intelligent appreciation of its true meaning—an egregious mistake.

The New England Journal protests that it is not ready for an obituary notice; that it is not "deceased." Neither have its editors "dried" their "pens." "Self-denying labors have not ceased' and "weary brains" refuse the "rest" to which they are consigned.

A simple change in names or, in other words, "getting married," does not warrant or justify a friendly cotemporary in the use of such terms as "deceased," "succumbed," etc. There is nothing of the kind involved in the transaction, and the editors of *The New England Journal* decline to be buried by means of sugar coated obituary notices. They have other "fallacies" to maintain and rejoice that the new arrangement affords a larger field in which to disseminate them.

Some months since we intimated that an iridium gold would be a good thing, and soon we were in receipt of some, from two sources, in the form of heavy foil, and upon practical tests, it proved no improvement upon the platinum gold, shade 3. A rich alloy of the metal does not work favorably in the form of foil, and we wish to suggest that some crystalline form of iridium, or iridium and platinum, electro-gilded, would probably accomplish the desired result, a hard enamel surface for gold fillings. M.

To an itinerant dentist who traveled through the Southern states thirty years ago, credit should be given for combining gold and tin in alternate layers, gilding his tin-foil with gold leaf, and collecting fees for gold fillings. M.

In consequence of an unexpected delay in the preparation of the title page and index to both the ARCHIVES and the *New England Journal of Dentistry* they will be mailed when completed.

Back numbers of *The New England Journal of Dentistry*, also a few full sets of the same can be had by addressing, Dr. C. T. Stockwell, Springfield, Mass.

A WORD TO EARNEST WORKERS.

Instruct your patients to take proper care of their mouths to brush the teeth and gums after meals, rinse the mouth with tepid water, pick the teeth with small quill tooth-pick, and use a narrow strip of rubber dam to cleanse spaces too narrow for the quill to go through. Be the decay caused by chemical or parasitical agents, we know they thrive only in filthy mouths, and that cleanliness is death to them. Such care will prevent more bungling dentistry than all theories combined, and when our microscopists return from their little trip, "all among the little stars sailing around the moon," they will be able to find those little fellows with black heads and red eyes. M.

PUBLISHERS SPECIAL NOTICE.

The publishers of the Archives of Dentistry are engaged solely in the printing and publishing business, and have embarked in this enterprize in the belief that the dental profession are ready to patronize and sustain a *strictly first class* INDEPENDENT journal such as the Archives now is and will continue to be.

The Dental Journal Association, which controls the columns of the Archives was organized solely in the interests of the profession of dentistry, and its members contribute their money, their time and their talents to the end that the periodical literature of dentistsy in this country' may be relieved of the interests of trade and become established upon the same basis as the periodical literature of other learned professions.

The business of this journal will therefore be conducted as is that of the periodicals of other professions, upon a money basis; consequently, while first class advertisements are hereby solicited, and our circulation is large enough to attract such advertisements, payment therefor cannot be accepted in anything but money or its equivelant.

The publishers wish to say to the subscribers in the *New England Journal of Dentistry*, that their subscriptions to the new journal for the year 1885 are hereby solicited, that the price of the consolidated journal will be $.300 per annum, payable on April 15, of each year, and that assuming that they will all wish to continue their subscriptions, the Archives will be sent to them unless its discontinuance is requested.

We believe the united forces now composing the editorial corps of the Archives will make the journal well worth the subscription price, but if after a thorough examination and a fair trial its continuance is not desired, we shall be pleased to be so advised, either by the return of a number or in any other convenient way.

We also wish to inform our subscribers that the Archives has no connection with general news paper agents or solicitors, and that all orders must come to the publishers either directly, or through their regular authorized agents or any member of its editorial staff.

All moneys on account of subscriptions or advertisements should be remitted direct to the publishers as no one is authorized to make any collections for us.

New England J of Dentistry
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